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EDUCATIONAL COMMUNICATIONS SYSTEM, PHASES I AND II.

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NATIONAL ASSN. OF EDUCATIONAL BROADCASTERS

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THE PURPOSE WAS TO CONDUCT A SYSTEMATIC INVESTIGATION OF THE NEEDS THAT AN EDUCATIONAL COMMUNICATIONS SYSTEM MIGHT MEET AND THE LEVEL OF INTEREST NOW PREVALENT AT THE COLLEGE AND UNIVERSITY LEVEL. CONTACTS WERE MADE WITH PROFESSIONAL EDUCATION ASSOCIATIONS, RESEARCHERS, COLLEGE ADMINISTRATORS, AND GOVERNMENT PERSONNEL. QUESTIONNAIRES AND PERSONAL INTERVIEWS WERE USED TO GATHER DATA. REPRESENTATIVES OF NEARLY 50 MAJOR INSTITUTIONS OF HIGHER LEARNING INDICATED THAT ELECTRONIC INTERCONNECTION IS BELIEVED TO BE ACADEMICALLY AND ADMINISTRATIVELY VALUABLE. PROJECTED USES HAVE BEEN SUGGESTED FOR ELECTRONIC INTERCONNECTION IN STUDENT RECORD TRANSFERS, COOPERATIVE RESEARCH TECHNIQUES, AND COOPERATIVE TEACHING. A FOLLOWUP STUDY PHASE WAS RECOMMENDED TO PROVIDE INFORMATION ABOUT EDUCATIONAL OBJECTIVES, TECHNICAL REQUIREMENTS, ADMINISTRATIVE ORGANIZATION, AND COSTS INVOLVED IN THE DEVELOPMENT AND OPERATION OF AN EDUCATIONAL COMMUNICATIONS SYSTEM. (HB)

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EDUCATIONAL COMMUNICATIONS SYSTEM

Phases I & II

NATIONAL ASSOCIATION OF
EDUCATIONAL BROADCASTERS

EDUCATIONAL COMMUNICATIONS SYSTEM

Phases I & II

**As an orientation to the project, this summary provides
information about its first year, April 1964-March 1965**

**JAMES A. FELLOWS
JOHN P. WITHERSPOON**

National Association of Educational Broadcasters

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I

Introduction

DEVELOPMENT OF THE IDEA

"Modern colleges and universities must accept the fact that no single institution can be the center or source of everything." The remark was made by a college president in an interview about the development of an educational communications system that would facilitate institutional co-operation.

He went on to say, "Any modern technology that can successfully be used to improve the quality and accessibility of education and educational materials must be applied if we are to make the most effective use of our students, faculty and institutional resources."

The comment cited here is broadly typical of the responses that were obtained in over fifty conversations with college presidents, deans, and vice-presidents, held recently to get first-hand reactions to a concept that would, by means of electronic technology, enable them to share personnel and physical resources.

The great majority of institutions visited were represented by persons who were not only excited about the possibilities for co-operation that would be feasible with an instantaneous communication system, but were in fact already involved in developing such approaches.

The plans for this study were arrived at through a circuitous, but rather interesting path. The difference between the reasons for a meeting in July, 1963, and its outcome are significant, for it indicates a breadth of interest and an awareness of total institutional considerations that before had not been widely prevalent among educational radio station interests.

The meeting, held at American University, had been convened to "brainstorm" the problem of financing a live interconnected educational radio network that had been funded in the Northeast by the United States Office of Education, the Ford Foundation, and a number of the participating stations themselves. The Educational Radio Network, as a live network of educational radio stations, was left inoperative at the premature termination of support from the National Educational Television and Radio Center with funds supplied by the Ford Foundation. Therefore, the group that met in Washington sought to continue the Northeast network and, if possible, to connect it with other regional networks.

That was how the meeting began. It ended with a realization that appeals to educational institutions for funds to connect educational radio stations were only partially valid, because in terms of total institutional needs the educational radio station represented only one enterprise that would be improved by an electronic interconnection system.

The conferees* recommended, therefore, that steps be taken to investigate the variety of educational services that could be provided by a more broadly constituted interconnection

*Included representatives from Educational Radio Network, Broadcasting Foundation of America, Committee on Institutional Cooperation and the N.A.E.B.

system, and in so doing to determine whether educational institutions were at all interested in the concept.

At the conclusion of the conference the group issued the following description of its proposal:

THE EDUCATIONAL COMMUNICATIONS SYSTEM: A plan to improve the quality and availability of education — formal and informal — by fostering inter-institutional co-operation through electronic interconnection.

This system would provide the facilities for radio network broadcasting and a variety of communications services including the sharing of faculty and instructional resources; the furthering of cooperative research efforts; the rapid collection, exchange and dissemination of information and technical data; the cooperative use of computers and other electronic devices; the conduct of conferences, meetings, and various academic and administrative activities.

The above statement was adopted by the twenty participants of the Conference realizing:

1. That a united effort could result in a much stronger Educational Communications System.
2. That the ECS would provide specialized uses directly related to the instructional and research responsibilities of educational institutions, governmental agencies and others who may participate.
3. That the opportunity now exists to integrate educational radio into the overall communications complex in such a way as to render an increasingly significant service to the educational community.
4. That the concept should be national in scope with the northeastern and mid-western regions of the country as the area for initial implementation and demonstration.
5. That the necessary financial support should be obtained to make possible a study which would determine the need for and feasibility of such a system.

The idea of institutional cooperation is not, of course, novel. But it has often been considered impractical without some kind of geographical contiguity (e.g., Duke University and the University of North Carolina; Harvard and M.I.T.). The reason for such impracticality was that previous notions have been built around moving the student from institution to institution. The information stayed put, and the person seeking it did the "interconnecting."

Now, much of the information can be moved and the student can extract it from an almost limitless number of places. The only barriers are the extent of the system and the difficulty or impossibility of coding certain types of information for electronic transmission. It would be naive to suggest that these are not substantial barriers, from an administrative and operational viewpoint. But it would be equally unsound to overlook technical achievements that make it possible to provide such a system and to transmit material that has heretofore been stationary and accessible only to a few scholars and researchers.

One particular technical point needs emphasis. There are substantial economies to be derived from using one electronic "path" for a variety of communication services. To

illustrate, if an interconnection system were established between Washington, D. C., and Richmond, Virginia, to interconnect radio stations in each community, and a separate system were established to interconnect television stations, and yet another to interconnect two universities, one would soon discover that technically, less frequency space would be required if all three services were provided through one system rather than three.

The reason for this economy can be understood in simple terms. If sufficient technical capacity exists to provide the three services in one "communications system," the actual content of the information is not relevant. It could be a television program, radio program, teletype message, digital computer data, or any combination. Such technical sharing of a single electronic path is cheaper because it is more likely to be fully used. As an example, few educational radio and television transmissions are made at night, so exchanges among computer centers could be arranged during this period. Other methods for operating the system efficiently can result in additional savings.

This, then, is the background. A meeting of radio station managers scheduled to save an educational radio network resulted in a plan to study broad institutional needs for a live interconnection system that could serve a variety of purposes at each college or university. The technical feasibility of such a system gave substance to the plan, for it assured that such a system could be developed if there were an interest in having it.

Is there such interest? In what professional areas is it most prominent?

GENERAL OVERVIEW OF THE STUDY

The meeting at American University resulted in one specific plan: the National Association of Educational Broadcasters should develop a procedure to determine the feasibility of establishing an educational communications system that would serve not only to interconnect educational radio stations, but computer centers, libraries, research centers, classrooms, television systems, and other educational facilities.

After preliminary discussions it was felt that a specific feasibility study resulting in delineation of costs, administrative arrangements, and particular objectives, was premature without more adequate documentation of the needs for an educational communications system and the attitudes held by professional groups and college and university administrators.

Accordingly, a different approach suggested that two initial phases be financed first to "establish sound procedures for the conduct of a nationwide study which will determine the precise objectives which may be met by electronic interconnection of institutions of higher education in the solution of a number of educational problems now confronted by these institutions and other interested organizations." Second, the conduct of a nationwide survey would indicate "the areas in which this system would be most useful."

Subsequent phases would depend upon the information found through the first two phases, and if conducted would involve a more specific feasibility plan and the development of model systems that could be operated experimentally for a period of time in different regions of the country.

Upon receipt of a grant from the U. S. Office of Education, the first two phases of the study were undertaken in April, 1964. An Advisory Committee was appointed to provide general counsel and assistance to the staff, and the first several months of the study were spent attempting to identify a specific approach and plan that would yield the most useful information in studying needs and attitudes related to an interinstitutional program of the type that has been described.

These preliminary surveys and the specific institutional surveys that resulted are outlined in the following sections:

Realizing that the broad services contemplated by an educational communications system could not be identified as fully as necessary through normal survey techniques, it was also planned to solicit a number of position papers from consultants who have had specialized experience in interinstitutional matters and could speak about particular opportunities that would be enhanced by the availability of an adequate interconnection system.

DESCRIPTION OF THE SURVEY

The first five months of the study were used to develop procedures that would be appropriate for a systematic investigation of the needs that an educational communications system might meet and the level of interest now prevalent at colleges and universities. This required a variety of contacts with professional education associations, researchers, college administrators and government personnel.

The purpose of these preliminary explorations was to derive a sense of where we stood with respect to institutional cooperation. It is, after all, to someone familiar with technical possibilities, a logical step to "wire up" higher education in some form that will allow for the exchange of people and things, but it could be an altogether different matter for the persons and institutions who would have to effect such cooperation.

Were they thinking in these terms? Was there a level of general awareness of the technical potentialities? What conceptions or misconceptions were common? Did administrators look upon the development of an educational communications system as a problem or as a possible solution to other problems?

Answers to these questions were sought by the project investigators in meetings with the Association for Higher Education, the American Association for the Advancement of Science, the National Education Association, the American Council on Education, the National Science Foundation, The Association of State Universities and Land Grant Colleges, the Association of American Universities, and a number of additional but similar professional groups.

Several individuals at colleges and universities were also consulted. Pennsylvania State University, the University of Chicago, the University of Michigan, the University of Wisconsin, Albany Medical College, and the University of Illinois were among the institutions represented in this phase of the exploration.

In addition, individuals in the government departments and agencies that might be concerned with the development of an interconnection system among institutions of higher education were also involved in this first phase.

Experimental network operations and regional education compacts have been described in several reports that were studied during this initial inquiry.

What was the result of the five-month investigation? What patterns did it suggest for the conduct of the more systematic study proposed for the second phase?

Information and enthusiasm for the concept of an educational communications system grew in direct proportion to the amount of time spent discussing it. At first it is a novel idea which causes a certain amount of attention, but the specific possibilities that educators envision, once they become involved in a discussion about it, is the most encouraging sign. Many had questions about the way in which such a system might work, what kind of

investment it would involve, who would run it, etc. They quickly saw that there was more than a scheme to interconnect educational radio stations and saw considerable potential in sharing library, computer, and other instructional resources.

In terms of the procedures for phase two, this meant a change in the approach for gathering the information. A standard questionnaire no longer seemed satisfactory, for useful answers in the earlier conversations grew out of an opportunity to discuss the idea and provide the respondent with enough information to elicit an informed reaction.

Therefore, the project investigators embarked upon a series of interviews at nearly fifty colleges and universities* in every part of the country. The interviews were conducted with a high level education officer at each institution, so that there would be the best possible chance of representing a cross section of professional areas. In most instances the interview was conducted with the Vice President for Academic Affairs, Provost, Vice President for Instruction, Dean of Faculties, or other individuals with varying titles but the same general academic and instructional responsibilities.

The institutions were selected so that all regions of the country would be represented, and colleges and universities of different types would be included, but there was no effort to establish proportional representation from small colleges, private universities and state universities. A plan that had been conceived earlier for a national radio network was used as a partial guide in selecting institutions, because this indicated a pattern throughout the country that might ultimately be an appropriate, basic skeleton on which to build an educational communications system.

Each interview was conducted according to a basic schedule of questions. Because three persons served as interviewers, the schedule assured that all important items would be covered. The seven questions were:

1. What are the major academic problems facing the institution today?
2. Does the institution engage in any cooperative programs, sharing of equipment or resources, joint use of faculties or other personnel, or exchange of information, with other institutions?
3. Are there regular communication paths established between institutions, including tie-lines, courier mail, microwave, heavy use of phones, etc.? What are their primary purposes?
4. Are there any particular difficulties with these exchanges? Are there plans to improve or expand into new areas?
5. Explore university extension relationships with the campus. What communication problems are there?
6. Consider such academic areas as teacher training, which require contacts with professionals scattered through a large area, and not only on the campus. What communication/coordination problems exist?
7. Suppose a system existed which provided continuous high-quality communication among all major campuses in the country. The system can transmit voices, music, still pictures, written materials, computer data, etc. What would be its most important uses, and its major drawbacks?

* See Appendix for a list of institutions visited.

A form for the interviewer to complete during each conversation provided a systematic method for reporting.

One further aspect of the survey was the development of papers on specific topics of concern to the study of institutional cooperation. These papers were included to provide a commentary on matters that needed more concentrated study than they would have received through the regular investigation procedures. One, by Professor Charles Siepmann, deals with the importance of educational radio in higher education, and how this can be stimulated through the sharing of resources and facilities. A second, by Dr. Ronald Hunt, broadens the concept of institutional cooperation to include industries and public schools. "It is possible," he writes, "that as much, if not more, could be gained by interconnecting the University of Pennsylvania with General Electric than with the University of Chicago."

A third paper, by Professor C. R. Carpenter, deals with television. Dr. Carpenter's essential point is that institutional cooperation is the most satisfactory way to take advantage of television for instructional purposes and reduce the per/institution cost that is required to provide superior quality teaching through this means.

Each of the papers covers, in a helpful way, material that could not be extracted from an interview or survey situation. They provide a context in which to consider the present suggestion for an educational communications system and recommend guidelines for additional applications.

FINDINGS

The results of fifty interviews at colleges and universities across the country are spelled out in this section. The comments and observations could be arranged in many different categories, but the division that seemed most useful in arranging for study of feasibility and ultimate implementation of an educational communications system is a listing by professional areas:

Biology
Law

Medicine
Physical Sciences

Education
Architecture

and by administrative and service areas:

Libraries
Radio and Television

Computer Research
Administrative Data Processing

Under each listing, we have indicated the nature of co-operative programs now underway among the colleges and universities contacted, and anticipated expansion or broadening of these programs. Where it is appropriate, existing systems for accomplishing some measure of "interconnection" are indicated.

In a number of instances the examples cited will not be applicable to electronic interconnection; however, they do illustrate the nature of cooperation now being accomplished, and reinforce the conclusions that college and university administrators are considerably less parochial than they might at first appear.

II

Professional Areas of Institutional Cooperation

BIOLOGICAL SCIENCES

Boston University and the Worcester Foundation for Experimental Biology, in Shrewsbury, Massachusetts, have developed a cooperative internship program that involves exchange of faculty and students between both institutions. The program of study has been developed in connection with grants from the National Institutes of Health and the National Science Foundation, and for many graduate students at Boston University is an indispensable part of their advanced study.

Ohio State University participates in a graduate program in Bioclimatology. This field is so new that no university is in a position to offer a complete graduate program on its own campus, although a co-operatively devised program among four institutions in the midwest makes this feasible. The University of Illinois is the coordinator of this unique effort established through the Committee on Institutional Cooperation of the Big Ten Universities and the University of Chicago.

LEGAL STUDY

Within the professions, great expansion is underway in the use of computers and computer interconnections. One such development is in the field of law at the University of Denver.

Natural Resources Law is of particular interest to the Denver faculty, and a project now in progress is recording on computer devices the vast body of law, administrative decisions and judicial precedent in this field. Through a carefully devised system of index code words, attorneys engaged in developing cases will be able to query the computer and receive a detailed set of references on aspects of the law that are applicable.

Chancellor Chester M. Alter reported that he looks toward the time when attorneys may query the computer from their offices, receive reference listings immediately, and finally receive printed copies of selected materials through facsimile, slow-scan television, or some other display device.

Similar ideas are being developed in other areas of law and in medicine. Among the specific applications discussed in the current study was the linking of centers that provide computer access to various aspects of the field. Interconnection of such facilities to provide access to all from widely separated points would provide a single resource of unparalleled value for legal study and reference.

MEDICINE

There are several developments in the study of medicine that will require some kind of interconnection of hospitals and medical colleges. Harvard, Yale and Columbia Universities have sensed the importance of knowing without undue delay what resources are in the medical libraries of the other institutions and are now compiling a card file that will provide this information. As the system grows, the information will be transferred to computer storage for quicker and more reliable retrieval.

Harvard University, Boston University, Tufts University and the University of Massachusetts will be interconnected by a multiple channel television system to hear lectures by leading doctors and surgeons. For the practicing physician, keeping abreast of current developments can only be done at a considerable loss of time while traveling to and from a central place where the lecture is to be given. Even in a metropolitan area transportation can use up two to three hours each time and has more often than not kept doctors from attending such lecture sessions. A system whereby medical personnel in an entire region could hear and/or see a description of a new medical discovery or technique in their own offices, cars, or in hospitals, will be an obvious benefit.

Perhaps the most encouraging and definite sign that medical institutions are ready, and willing, to share resources is the organization of an Interuniversity Communications Council (INTERCOM). The Council grew from a realization by the Association of American Medical Colleges that there must be improved communications among their institutions. INTERCOM has already involved high level administrators from the University of Virginia Medical College, Harvard University, the University of California, University of Michigan, and the State University of New York at Buffalo, and Duke University, and by early spring expects to have a formally organized corporation. Though in its early stages of development, the INTERCOM organization has already sensed the need to be broader in scope than their medical orientations would require. They, like the educational radio station operators, have realized that there is more to their parent institutions than at first met their eyes, and present planning of the Interuniversity Communications Council is taking this into consideration.

PHYSICAL SCIENCES

The most notable example of cooperation in the physical sciences is an extensive program at the University of Houston. Through a compact recently formed with Southern Methodist University, Louisiana State University, the University of Texas, Texas A & M, Florida State University and Rice University, these universities have agreed to carry on joint studies in Oceanography, an area of study that has important consequences and is being undertaken by universities throughout the country.

The University of Houston is also working with the Houston Research Institute to develop a feasibility study of facsimile transmission. Future application of facsimile transmission to sharing resources in oceanography and other fields is, to quote one respondent, "just a matter of time."

EDUCATION

At Pennsylvania State University, a United States Office of Education project is supporting a cooperative program to improve continuing education activities among the state colleges. The fifteen branches of the main university at University Park, Pennsylvania, will be sharing in academic programs produced on television tape, and will be "interconnected" on a delayed basis by means of video tape recording. The university already has closed circuit television interconnection with some of its Commonwealth campuses.

Four years ago, a study completed by Messrs. Meierhenry and McBride, at the University of Nebraska, indicated that over 453 formal courses that had been filmed, kine-scoped, or videotaped were available for use at other institutions. The existence of the National Instructional Television Library, the Great Plains and Northeast Instructional Television Libraries to distribute such materials indicates how extensively they are being used.

In Florida, the Associated Mid-Florida Colleges are developing cooperative programs as a "multilateral force for defense against the growing complexities of operating a small

private college." The institutions are Bethune-Cookman, in Daytona Beach; Stetson in De-land; Rollins in Winter Park; Florida Southern in Lakeland; and Florida Presbyterian in St. Petersburg. As the Miami Herald said, "They are all pressed for funds, short of facilities to serve the ever-expanding campus rush, and called on to widen their fields of instruction as knowledge increases."

Last year committees were set up to seek ways in which the five colleges could cut costs by working together and several ways were found:

"A cooperative library program is being worked out. Instead of duplicating each others' book bank, the member colleges are beginning to share and a station-wagon will soon be making regular inter-campus circuits with rare and expensive volumes.

"Each institution is beginning to work harder on established specialties and fields of interest, with an exchange of faculty members and students being arranged. Rollins has long-standing ties with Latin America and will expand them... Stetson has had a number of courses and research programs in Russian economic and political affairs. Florida Presbyterian offers opportunities to study Eastern cultures.

"Under the cooperative arrangements students from one institution may take special courses in these fields and another, and receive credit."*

The five institutions involved in this program are widely separated, yet a technical development served as a catalyst to bring the universities together. The catalyst was the completion of Interstate Highway 4 across central Florida. Before long, these and other universities that have cooperated to improve their instructional programs through conventional means will be using electronic highways for a large part of their inter-institutional effort.

At Louisiana State University a cooperative program in Library Science is being developed with the University of Southern Louisiana at LaFayette. It will meet in-service education needs for librarians and will result in a program that gives resident credit at both institutions.

Further cooperative programs with Tulane University and L.S.U. are being developed, particularly in the area of medical instruction. The co-location of the two medical centers makes extensive cooperation possible, and procedures are being established to accomplish this where it is practical and desirable.

A unique development at Louisiana State University is a proposal to develop approaches for a graduate study center. The initial center would be in cooperation with the Ampex Corporation and the International Business Machines Corporation, and would provide storage and retrieval of bibliographic data in chemistry and physics. A November meeting of all "computer interests" in Louisiana, though not a part of the graduate study center proposal, was convened in part to determine methods for sharing access to major computer resources from smaller, satellite computer centers.

The President of Ohio University, Vernon Alden, spoke recently in support of television as an effective instructional medium and in particular of the need to share televised resources. "...I can foresee the day when some of the classes in Physics or in Sociology might be taught by distinguished professors from Harvard, or Yale, or California, on this

* Miami Herald, December 5, 1964.

campus by educational television... One of our professors might be taped and his lecture might be seen in a university on the east coast or on the west coast."

The Southern Regional Education Board announced two years ago that thirteen universities under its guidance had launched a regional program for advanced graduate training in industrial engineering. "Industrial engineering educators feel that the best way to produce more high-level faculty for industrial engineering and to upgrade the education of those already teaching is to combine existing strength of faculties of the region."

A variety of additional programs indicate an extensive amount of interinstitutional development in education.

Boston University provides a center for the teaching of English to international students who have come to this country to study there and at other universities.

The University of Georgia in cooperation with Emory University provides the Atlanta Teachers Education Service and has made administrative arrangements for credit to be given at either institution for courses offered.

The Graduate Engineering Education Program at the University of Florida involves interconnection of facilities at Cape Kennedy and the University of Florida at Gainesville.

A project in teacher education involves the cooperation of Syracuse University, Cornell University and the University of Buffalo. The purpose of their joint effort is to increase the number of candidates for Master's Degrees in Education and the number of people training to become school administrators. The vastness of the problem and the specialties of the three universities suggested to them that the effort could best be made through a cooperative program of the kind they have developed.

ARCHITECTURE

At the University of Georgia a Conference on College Design was enhanced through a cooperative arrangement with the School Planning Laboratory at the University of Tennessee.

Carnegie Institute of Technology is currently developing one of the most far-reaching programs for the study of architecture. There, through the use of new computer techniques, it will be possible to feed the computer certain physical dimensions, which will then be represented by the computer in the form of a drawing that will indicate perspective; it also will calculate materials required. The system is highly sophisticated and unlikely to be available in more than a few major centers; however, access to the computer could be provided from off-campus locations through an educational communications system.

III

Administrative and Service Areas for Institutional Cooperation

LIBRARIES

Among professional groups interested in the concept of an educational communications system, perhaps none is more enthusiastic than librarians. There are several kinds of applications, which may be grouped under general headings as follows:

Small, relatively remote colleges and universities would be enabled, efficiently and quickly, to share the resources of major libraries, and thus facilitate research programs and advanced courses. Miss Ruth Bergman, Director of Libraries at the University of South Dakota, urges development of a system which would offer constant interconnection with the Rocky Mountain-Great Plains Regional Bibliographic Center in Denver. This interconnection should allow transmission of bibliographic information, research assistance and, by means of facsimile or some related systems, transmission of articles, extracts and graphic materials.

Similar views were expressed by people engaged in library work, research and guidance of graduate students in a number of similar institutions.

Large universities would be enabled to coordinate use of libraries on widely separated campuses. Dr. Robert Tschirgi, University Dean of Academic Planning, University of California, points out that his university finds it necessary to maintain two complete research libraries (one in Berkeley and one in Los Angeles), with a total of more than eight million volumes. Even with these huge collections, involving much expensive duplication, scholars on the remaining six campuses of the university find great difficulty in making effective use of the library system. This, of course, does not even take into account the eighteen campuses of the California State College System which are intended to achieve a measure of coordination with the University through a coordinating council.

Libraries may make more effective use of modern technology for information storage and retrieval. The catalog for the extensive regional collection of instructional materials housed at the University of Colorado is being transferred to computer cards so that users at other institutions may seek information and reserve materials directly from their home campuses. The essential fact that data processing devices may be actuated from any interconnected location will bring great changes in libraries within a relatively short time.

Through the use of electronic interconnection and modern visual transmission devices, special collections may be shared and cooperative research facilitated. President I. D. Weeks of the University of South Dakota notes that within his state three separate institutions with special responsibilities and specialized resources deal with the related problems of water resources, geology, and mines. The cooperative research that is undertaken by scholars in these institutions could be conducted more efficiently and perhaps more economically, if an electronic communications system could be employed for conference communication, teletype progress reports, transmission of graphic materials and cooperative use of computer research facilities.

Education leaders at nearly every institution were enthusiastic about the possibilities that automation affords for streamlining their library operations and for the eventual interconnection of their libraries to regional information retrieval centers and the Library of Congress. Being able to locate books more rapidly would save weeks of correspondence now required to find what library has a particular volume and then to order it through the Inter-Library Loan System.

Ohio University, Boston University, Trinity College, the University of North Carolina, the University of Alabama, the University of Houston, the University of Virginia and Syracuse University are all looking seriously at development of common catalogues with other institutions and, on the whole, officials at these schools are most encouraged by the prospects that an educational communication system presents for information storage and retrieval.

The extent to which librarians are concerned with these development is well summarized in an interim policy statement by the American Library Association ("Television and Libraries," an Interim Statement of Proposed ALA Policy Regarding Development of Educational Television Facilities and Services, July, 1964):

"In the realm of instruction, research and information services a long list of recent technical innovations, including those listed below, may be shown to be having major influence on social trends and the changing shape of education: Computers, facsimile and data transmission; self-learning aids; cartridge-loading sound recorders and playback units; miniaturization and simplification of all communications equipment; and greatly expanded capacities for storage of ideas and information in micro- and computer tape form, etc.

"In keeping with such needs and changes, libraries across the United States have during the past decade -- whatever their geographic or institutional setting -- come closer together, forming on a cooperative and voluntary basis what amounts to a national system. Thus, today the library function in America may be said to be a national effort involving the conscious professional interruption of the total flow or stream of communication in all recorded forms or formats, organization and storage of media as necessary, and selective retrieval and active dissemination of ideas and information, again in whatever form or formats may be required to satisfy individual and group needs. Vital to maximizing performance of this function is the effective harnessing of all types of modern communications technology including television."

ADMINISTRATIVE DATA PROCESSING AND DISTRIBUTION

To an increasing extent, university administrators feel a need for rapid transmission of administrative material. The applications include the following:

As more regional academic structures are created, involving cooperative instruction, rapid transmission is needed for data concerning admissions, registration, course progress, and credit.

Scattered campuses within a single system are developing centralized admissions systems. For example, The University of California's Berkeley campus reached its maximum possible enrollment in 1964, and procedures for re-routing the remaining qualified students had to be devised. Ohio University is developing central record files to keep data on students at its several branch colleges. Pennsylvania State University uses a telephone system to exchange personnel information with related institutions. At Rutgers, the State University of New Jersey, a Center for Information Processing contemplates growth to include other colleges.

In order to realize economies in data processing, state systems are now moving toward network interconnections with central computer facilities. Some discussion has taken place concerning development of regional systems. At least one state system makes use of data processing facilities outside its own borders: a company in Los Angeles serves the Oregon State System of Higher Education.

It has been proposed that the continuing problems of student placement, award of scholarships and fellowships, postgraduate employment assistance, and perhaps even faculty placement could be alleviated through an interinstitutional communications network.

RADIO AND TELEVISION

Radio and television are essential elements of an educational communications system, not only for the transmission of material for radio and television broadcasting, but because sound and sight communication techniques will serve many of the professional and administrative areas already mentioned. Closed circuit television will undoubtedly be used for the sharing of specific lectures and demonstrations; closed circuit radio, already being demonstrated by the American Telephone and Telegraph Company under the title "Tele-Lecture," can be used for inter-university conferences and other primarily aural communication needs. A broadly conceived educational communications system also includes the feasibility of administrative interconnection among television and radio facilities through a teletypewriter exchange developed as part of the basic system.

The development of an effective non-commercial broadcasting service for the people of the United States has been severely restricted over the years by the need to distribute programs by tape rather than by a live interconnected network. Only the interconnected network, a commercial necessity since the formation of NBC in 1926, can provide significant service in the crucial area of timely public affairs broadcasting. Only instantaneous interconnection can provide actual interaction between people and ideas in separated areas of the country. Interconnection also provides an essential sense of network unity; it makes possible national program promotion; it allows instructional programs to deal instantly with world events; it is, literally, the central condition of a true national program service, whether commercial or educational.

For these reasons, educational broadcasters over the years have attempted to find ways to interconnect their stations, without success beyond a regional level. They now see great possibilities in the development of an Educational Communications System. More than two-thirds of the nation's non-commercial educational radio stations and about a third of its non-commercial educational television stations are licensed to colleges and universities. Most of the others are within very short distances of universities. Thus, an educational communications system even limited to institutions of higher education could, through the interconnection of broadcast facilities, be of enormous benefit for the public at large.

As colleges and universities have demonstrated that sharing resources can permit them to offer programs of study that could not be undertaken singly, so have educational radio and television broadcasters shown that people and materials too expensive for one station to use can be attracted to a larger audience available through a network of stations. The more timely the topic, the more essential a live interconnection system becomes.

The importance of using radio and television for public purposes was concisely phrased by Dr. Jerome Weisner, former Special Assistant to the President of the United States for Science and Technology, on the occasion of the dedication of the Educational Radio Network in 1961.

"...The failure on the part of the citizen to appreciate the difficult and complex issues of his society, to see the alternatives clearly, is likely to be disastrous in a nuclear armed world. The tools of destruction bid well to out-distance the tools of understanding, persuasion, compromise, courage, adjustment -- the social mechanisms by which one man can live with another man in peace on this planet... We must, therefore, not only improve the dissemination of information but must bring to bear the most informed minds to comment on this information, to provide the background data, to help put it in perspective."

Professor Charles Siepmann's paper in the following section of this report elaborates the need for a vital and significant educational radio service, and Professor C. R. Carpenter's paper supports the thesis that television may best be applied to materials cooperatively developed among several institutions. Both are necessary to a full grasp of educational

needs that can be served most effectively by an interconnected network of educational institutions.

COMPUTER SERVICES FOR RESEARCH

Today's university is such a vast and complex entity that its administrative operations are often made more efficient by the application of automatic data processing and computer calculations. Certain opportunities that exist for sharing such operations and the information they retrieve have already been suggested in a previous section of this report. A further illustration of computer usefulness is for research, and in this area, too, a number of advantages can be realized through systems that are cooperatively planned and used. Perhaps the outstanding clue to these advantages is the sophistication of calculation that can be accomplished with large computers, and the great expense of such machines. Their cost and operation require as full a use as possible to be economical and this is best achieved by increasing the number of users. When this can be handled through remotely operated programming devices, there are additional conveniences for the institutions located away from the main center.

Probably the most extensive cooperatively used computation center is at the Massachusetts Institute of Technology. The center was established in 1956 to "further the application of computer technology to research and educational activities. At present forty-five other colleges and universities throughout New England cooperate with M.I.T. in these activities.

Fourteen progress reports document the extent to which faculty, graduate students, and other researchers have used the M.I.T. center during the past eight years. They provide strong support for the development of major regional centers for computation that can be used by colleges and universities with their own, but less extensive, computer installations.

There are other examples: at Pennsylvania State University where a connection with I.B.M. in Yorktown Heights, New York is used several hours per day; at the University of Connecticut where some use of that institution's computer is occasionally made by nearby schools and the University in turn uses an industrially operated computer near Hartford; at the University of Alabama which uses research facilities at Huntsville. The University has leased lines to Huntsville and a center in Birmingham to improve its communications among these points. A special airplane to Huntsville one or two days a week allows for the interchange of scientists and instructors with the Marshall Space Flight Center of the National Aeronautics and Space Administration in Huntsville.

The most recent example of cooperatively planned research is the Virginia Associated Research Center, a joint effort of the College of William and Mary, the University of Virginia, and Virginia Polytechnic Institute. The Center will manage and operate the Space Radiation Effects Laboratory under a N.A.S.A. contract. Space agency scientists will use a N.A.S.A. cyclotron approximately half the time; the other hours will be available for more basic research among the students and physicists from the universities involved.

Commenting on the development of the Virginia Center, the Washington Post said:

"As scientific research grows more expensive, the advantages of cooperation among universities become more obvious... The new Virginia Associated Research Center, now under construction on the Lower Peninsula, demonstrates one imaginative and highly hopeful answer to the colleges' danger of being priced out of the field of high-energy physics."*

The variations that are possible for using computers in research are for practical purposes without limit at this time. Only one generalization can safely be made - that we shall see more rather than less of computers in university and academic research, and that large computers will be designed to they can be used from interconnected remote points.

* Washington Post, December 7, 1964.

IV

General Attitudes About An Educational Communications System

As leading university administrators discussed the concept of the Educational Communications System during the Phase II interviews, the key word most commonly used was "inevitable."

Far from considering ECS a futuristic scheme removed from the present academic mainstream, these men generally consider electronic interconnection on a "system" basis to be of immediate practical value and, in some cases, urgently important. This attitude prevailed at institutions both large and small, in isolated locations and in urban centers. The reasons may vary from one university to another, but the favorable attitude, and the need for immediate development, were nearly unanimous. Only two of the institutions visited reflected a general view that interconnection would not be of immediate or long range importance.

The climate of acceptance for an educational communications system is one manifestation of the growing need to adopt the principle of institutional cooperation. While few university administrators would consider the present state of cooperation to be optimal or even adequate, advances on many fronts have been made in recent years. This is attested to in part by the growth of such regional cooperative organizations as the Committee on Institutional Cooperation (The Council of Ten and the University of Chicago), the Western Interstate Commission on Higher Education, and the Southern Regional Education Board. Programs undertaken through such groups range from cooperative research in mental health (WICHE) to a cooperative repository and teletype system for member libraries (Midwest Interlibrary Center).

Still, the principle of cooperation has just begun to make itself felt. Two parallel developments will speed its progress:

1. In more than half the present interviews, the problem of institutional specialization arose: knowledge has become so diverse and complex that no single institution can be master of all areas.
2. Modern educational media make cooperative teaching feasible, and the channels that link campus television and radio systems can also facilitate cooperative research. As an aside, while inter-campus television teaching has not had notably cordial acceptance to date, its growth is generally predicted by administrators in those institutions that are now making successful use of on-campus instructional television.

While expressing his interest in the development of an educational communications System, Chancellor Chester M. Alter of the University of Denver predicted that educational historians of the next century will see lack of real institutional cooperation as the great failure of higher education in our time.

Dr. Robert Tschirgi, University Dean of Academic Planning, University of California, made an equally strong statement. In concluding a list of specific uses for a system of electronic interconnection, Dean Tschirgi said that in his opinion the academic community of the United States - and preferably the world - should, to a greatly increased extent, exert a positive, creative influence on the development of human society; and that such an educational communications system is "absolutely indispensable" to the realization of such a concept.

It is the opinion of the investigators, based on the Phase II Survey, that the academic climate of acceptance is extremely favorable and that more information concerning feasibility, costs, administrative arrangements, and educational objectives is eagerly awaited.

V Consultants' Papers

The themes of the three papers were mentioned earlier in this text. Only their full titles and the authors' credentials are cited here.

RADIO AND ITS RELATION TO HIGHER EDUCATION IN THE UNITED STATES.

Charles A. Siepmann

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MODERN TOWERS OF BABEL.

Ronald L. Hunt

Dr. Hunt is Director of Community Educational Resources in the Department of Education, San Diego County.

BARRIERS TO THE USE OF EDUCATIONAL AND INSTRUCTIONAL TELEVISION.

C. R. Carpenter
R. N. Willis

Professor Carpenter is former Chairman of the Department of Psychology at Pennsylvania State University and Director of its Division of Academic Research and Services. He is now on leave from Pennsylvania State and is a consultant to the University of North Carolina.

Dr. Willis is Research Officer and Budget Analyst for the Board of Control in the State of Florida.

RADIO AND ITS RELATION TO
HIGHER EDUCATION
IN THE
UNITED STATES

Charles A. Siepmann

RADIO AND ITS RELATION TO HIGHER EDUCATION IN THE UNITED STATES

I. Radio and The Crisis in Education

"When one considers in its length and in its breadth the importance of this question of the education of a nation's young, the broken lives, the defeated hopes, the national failures, which result from the frivolous inertia with which it is treated, it is difficult to restrain within oneself a savage rage. In the conditions of modern life the rule is absolute, the race which does not value trained intelligence is doomed. Not all your heroism, not all your social charm, not all your wit, not all your victories on land and at sea can move back the finger of fate. Today we maintain ourselves. Tomorrow science will have moved forward one more step; and there will be no appeal from the judgment that will then be pronounced on the uneducated." *

It is fifty years since those prophetic words were written, and still "the frivolous inertia" persists. We were once the pioneers and pace makers of universal education, seeing it as the first condition of a viable democracy. Today, with time running out against us, we drag our feet in bringing our methods and resources abreast of the new unprecedented claims that survival as a civilized, as well as a technologically efficient, nation make upon education. One aspect of the contemporary crisis alone stems from factors beyond our immediate control — the population explosion and the student bulge in our schools and universities. The rest are of our own making, consequences of the public's persisting disregard of the centrality of education as a claim, second only to defense, on the public purse, and of an obstinate adherence, among educators, to outworn methods, discredited or unproven shibboleths, of insecurity and petty vanities and rivalries.

It is this purblind conservatism that has obscured one cheering aspect of an otherwise gloomy and disquieting situation, namely, the fact that science has put at our disposal resources that provide, if not a cure, at least a palliative for the back breaking strains on our educational resources. Of these some (like programmed instruction) remain to be proven and perfected, others (like television) have been too hastily embraced (over 50% of our schools are said to be making some use of it) to ensure effective use. But one (radio) has been with us for forty years. What follows is a plea for sober reconsideration of the place that radio might have in the overall design of higher education and for resourceful, imaginative use of the opportunities it has long offered us. Even if these be adjudged as no more than marginal, these, surely, are times in which it is plain irresponsible to leave a single stone unturned that might help make straight the path of education which alone can lead us to an assured and happy future.

We face, admittedly, a problem at the very outset — the mindset, of the public and of educators alike, to radio as a medium of communication. Far too many conceive of it as having been "replaced" by television. It is as though we had all fallen for the slogans thought up on Madison Avenue and intended to persuade us that what's new alone is good. Obsessed with an induced and deluded fear of "obsolescence," we have in this instance, as in so many others, squandered a unique resource and passed up golden opportunities. Even commercial broadcasting, which is largely responsible for relegating radio to the sidelines, is beginning to discover, after twenty years, the error of

* A. N. Whitehead, *Aims of Education*, Mentor Books, p. 26.

its initial panic when television hove up over the horizon and is finding new, profitable use for it. The early cry that, with television's advent, radio was dead is at long last exposed for what it always was — a calculated lie or an egregious error of judgment. The plain fact is, and always has been, that radio is not dead, but for two long and costly decades has been buried alive. The time is overdue to disinter it and restore it to new and vigorous life. But given the admitted mindset of a gullible public and its wholesale desertion of the radio for the television medium, dramatic demonstration of radio's true potentialities will be necessary, and this can only stem from considered reappraisal of its distinctive genius.

II. Radio's Distinctive Attributes

I have no doubt myself that television constitutes — potentially — a new and promising art form. But its peculiar grammar and syntax remain for the most part to be written. Too much that passes for television today is, in fact, bastard art — the illegitimate offspring of two noble parents, born out of film by radio. (Television is not my theme, but one instance may clarify my point, as it may serve to demonstrate how readily public taste and a nice understanding of what constitutes true art can be corrupted. Consider the use of film, as such, on television — as though the disciplines involved and the beauty to be realized by projection on a 35 mm screen could be 'transferred', without barbarous distortion and loss of aesthetic delight, to the cramped dimensions of the idiot box!) The fact is that a great deal that we see on television is what were better heard on radio — without essential loss and at fantastic savings of cost and effort.

Visual reinforcement of the spoken or (as in books and articles) the written word has immense advantages to both clarity and speed of understanding. But to acknowledge this should not deprive us of two insights: 1) that visual reinforcement is possible with radio (see later) as well as on television, and 2) that there's a point beyond which making everything easy on the eye may prove positively harmful to true activity of mind and of imagination. No medium better demonstrates this than does radio, as a few examples may illustrate — and in what follows the attempt will not be to denigrate true television but to establish more clearly the true, distinctive virtues of radio as related to the proper "engagement" of the recipient in any communication.

1) Radio Drama

Of all the losses resulting from relegating radio to use in the bedroom, the bathroom and the car perhaps the most grievous is the demise of radio drama. For here the seeming disadvantage of "listening blind" was converted into an asset. All you heard was language, some sound effects and music — as a bridge or as emotional underscoring of present or coming action. All the rest was filled in by the listener's imagination. For in radio the listener is part author of the play, the writer suggesting, only, what for the most part the listener creates in his own mind. The stage, in radio, is the listener's imagination. The effectiveness of this partnership, in terms of the hold of radio on the listener's attention and the degree of his personal identification with what transpires, is variably and dramatically attested to in listening situations as contrasted as those of school children tuned into, e.g., dramatic reenactments of history ("Teaching history backwards" was one of the early triumphs of school broadcasting in Britain), the morbid absorption of women in daytime serials (so that Saturdays and Sundays, when no serials were on, were regarded as the "black days" of the week), and of course the national panic created by Orson Welles' "Invasion from Mars" (imagine this last as anything but ludicrous on television!). The educational, as well as

the artistic loss involved in the demise of radio drama is suggested by the fact that, such was the success of its use, as of other radio techniques, in broadcast to schools in Britain, that the acceptance of television by teachers there has been and remains retarded. Whereas 30%, odd, of schools in Britain tune in to television, 73%, odd, remain regular devotees of radio.

2) Aural Versus Visual Understanding

While we are lamentably short of research on the subject (perhaps the most serious brake on the discovery of television's distinctive, potential contribution to education), it seems reasonably clear, theoretically, that there are areas of communication in which visual resources, additional to the spoken word, range in value from quintessential (e.g. in science demonstrations or in a course on the great painters) to nil. Indeed, I'd support the view that there are situations in television today where what we see not only adds nothing essential to understanding or enjoyment (e.g. sight of a musical performance — I tend to close my eyes when listening to music) but detracts and/or distracts from what we take in. While the matter is no doubt to some degree subjective, I would myself back the hypothesis that it should be part of our intellectual training to accustom us to deal with some facts and ideas unaided by visual reinforcement. I have already cited radio drama as a mode of communication enhanced by the exercise of faculties independent of our use of sight, but there are many more that bear on the educational process, and though I use examples (for familiarity's sake) from the field of broadcasting to the general public, their educational analogues are easy to see and will be pointed up specifically later in this paper. Such examples may serve the further purpose of clarifying what I contend are misuses or redundant uses of television where use of radio (and let us always bear in mind the formidable differentials of cost involved) would be either preferable or just as good.

a) Newscasts

While conceding that there are situations in which a picture is worth a thousand words — as we witness the event itself — I would claim that normally a newscast reports an event or something said in terms for which language is the most effective vehicle of communication. I am in no essential way advanced in my understanding of a speech, e.g., by the president, by having his picture flashed on the screen or even by having excerpts from what he said "reported" on film. It is positively distractive, as well as a break in the illusion of reality, to watch a TV announcer pretend he's reporting direct to me and watch those eyes go up and down to the script. With occasional exceptions (and here, even, we must beware of the temptation and tendency in TV to select, and therefore to distort, news editorially because dramatic pictures are ready to hand) I would contend that the essence of news is concise and accurate reportage and, as such, radiogenic.

b) News Commentary

A commentary, even more than a news report, is quintessentially an effort to convey (by, literally, the only means available — in words) what events signify. Here pictures can scarcely help at all. It is a man's thought and judgment that we listen for and words alone, here, signify. N.E.T.'s "The month in perspective" is a good case in point. Two journalists, under (admittedly) a marvelously inept chairman, discuss for an hour what the events of the past month signify. Not only is nothing added, but irritation and distraction intrude themselves as we are asked to look at bad still photographs

of De Gaulle, L.B.J., etc., and equally badly reproduced cartoons. Where a man's thinking is what we are after, words are all we need — and a disservice, I'd claim, is done educationally as we accustom people to expect superfluous visual trimmings as the price of their attention. Wherever the effort is to convey ideas (and in education, as distinct from training, this should be always), clear thinking and lucid, concise, expression are the essential ingredients of the dish with only exceptional instances where visual garnishing is needed.

c) Discussion

Here we have, perhaps, the example par excellence of the redundancy of visual communication. For in discussion ideas are everything. It is (in debate) a battle of wits, in true discussion an effort at mutual understanding by reconciling differences or, where this is not possible, the clarification of conflicting opinion that is involved. "The persuasion of your will is not to be thought of. We offer themes for your consideration." The essence of discussion is the thought conveyed. Even the byplay of interest — in the looks and glances and reactions of the speakers — could be claimed, in however minor a degree, to be distractive. Radio, in the bygone, happy days when there was discussion on the air, taught us to listen and attend, without distraction, to ideas. It was a splendid discipline to which millions lent themselves and at which they became adept.

The above are but examples of what is distinctive about radio communication. But they suffice, perhaps, to indicate the locus and appropriate occasion of its use. Granting that the mode of communication — oral, visual, the printed word, non-oral-visual (e.g., music), oral cum visual — depends on what we seek to communicate, the matter for decision, vis a vis radio, is where and why (in and out of education) pure oral communication is either preferable or adequate. Apply this yardstick, and the proper domain of radio communication comes reasonably clear.

This, however, does not define the full scope of radio's potentialities. For there is also what, for want of a better term, I'll call "Impure" radio. Radio communication can, and in proper circumstances should, be supplemented by visual resources. Here, for higher education, we can draw upon experience in radio school broadcasting, pre-eminently in Britain and Japan. For children it was early recognized that a risk in radio is the distraction of the roving eye. Eye as well as ear had to be engaged, serving the further useful purpose of concretizing and focusing attention on the subject discussed or demonstrated. Hence the illustrated pamphlet, supplementing the radio course with illustrations of points made to which the student's mind and eye can be directed.* Hence, similarly, the film strip, or film clip coordinated in the lesson plan with the radio communication. There are a dozen such ways in which visual material can be harnessed to "listening blind," each expanding and rendering more flexible the scope of radio's use. Excluded, in fact, from radio's realm of discourse are only subjects where visual communication predominates as the condition of clarity and understanding. We have much to learn in this matter from countries less prosperous than ours which, lacking resources for exploring the use of such expensive tools of education as television and programmed instruction, have mined the least expensive of all mass media, radio, with greater resourcefulness and more imagination. We should not be too proud to study such experiments in "radio vision" as have been made, e.g., in Holland,

* Anyone familiar with BBC's pamphlets for school broadcasting will know how, by virtue of the pictorial quality and layout, arresting to the eye, as accompaniment to what is heard, such visual supplements to radio can be.

Radio-Sorbonne and some of the North African countries. There is not, as claimed earlier, a stone that, given our plight in education, we can afford to leave unturned. We have, moreover, some precedents here at home whose worth equally warrants evaluation, notably the telephone-radio network courses pioneered at Stephens College and the Princeton Institute for University studies with its taped lectures, correspondence tests, essays and examinations.

III. Radio As Mass Communication

For fear of laboring the obvious I have left to the last aspects of radio so self evident as to be taken for granted — but for the persisting purblind attitude among educators earlier alluded to. Yet for the record let me briefly spell them out. For what many have come, however tardily, to recognize about television holds good (and has for forty years) of radio too. For the first and last time in this paper radio and television will be treated in terms of shared attributes.

Radio, with television, is the only medium that has at once conquered both time and space. The consequences for education have been largely overlooked for being, like much else, right under our nose and hence taken in stride without being understood, still less availed of. Radio broadcasting means that there is no part of the funded knowledge and experience of mankind (at least that is capable of sound transmission) which is not now universally available. Plato could only directly influence the handful of disciples within range of his voice. Today, through broadcasting, the world could be his audience. For students at all levels this means a revolutionary change in the scope and nature of their educational experience and a new claim they can properly make of society. For where our greatest needs are concerned, when it becomes physically possible to meet them, they constitute not a need, not an aspiration only, but a right. In terms of stark and simple justice, quite apart from the benefits accruing to society itself, the advent of simultaneous mass communication means that it is the birthright of every child, however poor, however remotely situated, to know, throughout the years of formal education — and on through adult years, what it means to sit at the feet of a great teacher. And it means more than this. It means exposure to excellence in all its forms enhanced by the resources of the radio medium. Not only the greatest teacher, but the greatest music, wherever performed, the greatest rendering of verse and prose and drama by the greatest performers, wherever they may be on earth, within or beyond the confines of America — all these and more are modern man's prerogative, and, properly conceived (seeing that they shall inherit the earth), the particular prerogative of youth. Couple this fact with the relative cheapness of radio transmission, and the implications for education should be obvious. For all that, let us spell some of them out.

IV. Radio and Its Use in Higher Education

Effective use of radio in higher education depends on grasp of two aspects of the contemporary situation.

1) New Demands on Higher Education

First and foremost, we must recognize the new, expanded role that it is called upon to play — and some of the attendant difficulties. For it is literally true that in education never before has so much been asked of so few. There is, in the first place, the matter of what, for purposes of living in the modern world, constitutes an educated man. A

greater body of general knowledge is required of him, including global perspective, as part of his intellectual and moral equipment for contributing usefully to society. And though it be true that "God so made the world that there are more topics desirable for knowledge than any one person can possibly acquire" and that thus "the world is made interesting by a delightful ignorance of important truths," we must all of us at least make a stab at expanding the horizons of our knowledge and awareness.

There is, second, the need in modern technological society for a vast extension of technical skills and scientific specialties.

Third is the consequence of cybernetics as it expands leisure and poses new problems of training people to use it fruitfully.

Fourth, are the expanded services of adult education now looked for and needed by those deprived of a college education, and by professionals (e.g. doctors) in search of continued "in service" training.

Fifth, is the ever growing claim on our universities by foreign, and particularly underdeveloped, countries for training and services that constitute the debt owed by the have to the have-not nations of the world. Any one of these amounts to a tall order. Taken together they tax our resources and our resourcefulness to near breaking point.

And here we confront what, at first sight, seems a tragic paradox. For this unparalleled demand for expansion of effective service coincides with a tidal wave of students clamoring for entry to higher education which threatens, by 1970, to double enrollments. No comparable increase of faculty (even if satisfactory inducements of pay could be anticipated) can be looked for. An admittedly crude measure of our plight is the percentage of faculty members with Ph.D. degrees which, over ten years, has steadily declined. Indeed it is estimated that though we mustered into higher education every recipient of a doctoral degree between now and 1970 we still would not have enough to fill our depleted ranks.

2) Radio's Revolutionary Implications

The second aspect of the contemporary situation that claims our attention is radio communication itself. For, properly seen, it offers the means a) for more effective and economical redeployment of the depleted manpower available to higher education b) for the badly needed higher standards of teaching for all c) for expansion of services that might approximate the growing need therefor d) for much needed and long overdue reforms in our techniques of higher education. This is the palliative for our troubles earlier referred to. Let us work backwards and deal first with reforms.

It should, as earlier referred to, be obvious to anyone prepared to face the facts that, if we proceed along present lines, expanded enrollments are going to combine with growing shortages of faculty of high scholarly distinction and teaching capacity to spell out a dreadful certainty — the increase of class sizes to mammoth proportions and/or the decline of quality instruction, and most probably both. A simple reform would avoid, in large measure, this appalling and all but certain prospect. It involves the abolition of compulsory attendance at classes, as condition of degree awards, from the bachelor's to the master's and doctoral degrees. Details of this suggested reform would have to be worked out with due regard for local conditions. But in broad outline the scheme would be something as follows.

In the first two years of college (to take up the slack of student's retarded development in high school*) students would attend classes, as now, compulsorily — but with this difference, that all or most of these would be given either on radio or television (according to the distinctive genius of either medium, as measured by the yardstick suggested on page 21). These lectures would be given by the ablest teacher (not all scholars, by any means, are also good teachers) on the faculty or the combined faculties of co-operating universities, whether regionally or nationally. For radio, like television, breaks down the geographical insulation and redundant duplication of faculty that physical access to a given institution has thus far made necessary. Three advantages immediately accrue. Every student will now have access to the greatest available teacher in his field. At present (at any rate in the required courses that predominate in the freshman and sophomore years) such access depends on the luck of the draw as students are allocated to one or other of anything from ten to twenty "sections" in which precisely the same subject is taught. The second advantage is that by repeated broadcasts classroom scheduling and the congestion at peak hours can be reduced or abolished as students "attend" in their dormitories or other available accommodation — or for that matter at home. Third and greatest advantage (to students and faculty alike) is that quality instruction of the highest order for all students is combined with redeployment of the released section instructors to conduct group discussions, seminars and even tutorials, or for the scholarly to devote fuller time to writing and research.

In their junior and senior years undergraduates would be released from all compulsory class attendance and thrown on their own resources for self-dependent study in assigned areas of reading and research and under tutorial supervision in preparation (as in European universities) for final, gruelling examinations. Elective lecture courses, likewise given on radio and/or television, related to their field of study would be provided for.

For the master's degree all compulsory lectures would be abolished while a rich and varied range of radio and/or television lectures would be available, to be heard or seen at students' discretion as supplement to and enrichment of self-dependent studies combined with seminars and/or tutorials for which again, by redeployment, faculty would become available. Many such courses could be taped for re-broadcasting as needed.

Doctoral candidates would attend no lectures but work on their dissertations, under guidance of a tutor, completion of which, together with a gruelling final oral would be the basis for awarding the degree.

The net gains of this plan may be summarized as follows. Radio makes possible the pooling of teaching talent of the highest order as between co-operating institutions of higher learning however widely separated in space, whether regionally, nationally or, on occasion, internationally. Students, whatever the institution they attend, all have equal access to the finest teaching available and in group discussions and seminars enjoy contact with faculty of which all but the privileged, as of today, are deprived. Savings (amounting in the aggregate to tens of millions of dollars) on costs of physical accommodation are ensured as, by repeat broadcasts — and access to tape recordings in an audio-visual library — student convenience in the matter of class attendance, is facilitated. The teaching load of faculty is markedly reduced, allowing for redeployment of time and differential talent along the lines suggested. A smaller faculty can

*One measure thereof is the fact that 2/3 of our colleges find it necessary to provide "remedial" courses in English composition — at an annual expense of \$10 million!

be made to go further, in terms of more effective service to both students and scholarly research, than is at present feasible. Not least is the advantage of the progressive discipline of students in self-dependent study which should be the ultimate goal of all formal education.

I am not sanguine that my fellow educators will see the above as self-evident derivatives from the new resources that broadcasting makes available to education. But no new idea ever bore fruit without the sowing of the seed, however stony the ground. But dismiss the whole plan as a misconceived and impracticable pipe dream, and we still face the challenge and the opportunity offered us by radio broadcasting's conquest of time and space. With our present lecture system left intact, radio (as well as television) make possible 1) inter-institutional pooling of teaching talent (already successful, over television, in Texas and Oregon), 2) redeployment of faculty for more effective and economical use of their time and skills, 3) availability (in section teaching) of the finest teacher for all students and, finally, an extension of college and university service beyond the campus in such areas as are described below.

V. Radio and Extramural Services

The scholar's ivory tower and the ivy covered walls of college campuses are pleasant to the eye but obstructive and confining conceits in an age when further education for all and higher education for some is the condition of survival. Like the walls of Jericho they await a trumpeter to blow them down. The trumpet is to hand — radio, with its universal reach. Wanted, the trumpeter, concealed by the fancy dress of the college dean and/or administrator. Perhaps we can induce him to blow by showing him the advantages of doing so.

There are, of course, two views on this matter of the function of higher education. The style, personality and content of two recent books, one by the president of Harvard, the other by the chancellor of the University of California, convey them eloquently. The former is conservative, the latter liberal or, better, expansive in outlook. I prefer the latter because it is at once bolder and more realistic. Clark Kerr sees the modern university as virtually all-embracing in its services, as in its clientele. No longer a privilege for the gifted or the wealthy few, it aims at near-universal service — both because this is required by a viable, modern society and because modern facilities (radio broadcasting preeminently so) makes it feasible.

The Bible properly warns us of the folly of pouring new wine into old bottles. What is needed, however, is something different — the preservation of the old, vintage wine — together with restriction of its use to those with a nice palate — and addition of a cellar for wine less mature and hence more popular. Higher education (mostly on campus), reformed as suggested earlier, needs to be upgraded in its standards by restriction to such as can profit from it. It is sentimental and quite unrealistic to claim it as a "universal right." It isn't, because it can't be. Education, from kindergarten to graduate studies, is an upward climb with the gradient getting steeper in proportion to the distance traveled. Its upper reaches should be reserved, by exacting standards of entry, for the relatively few with the stomach and the legs to traverse it. These are the prospective leaders and pacemakers of society in every walk of life and not the academic only. Higher education should be for such and such only. To conceive of leadership as somehow incompatible with democracy is to misread history and misunderstand democracy. For the plain fact that history spells out for us is that, always, the few lead, the many follow. The theoretical virtue of democracy is that the people, adequately trained and educated thereto (the indispensable condition of its operation) choose whom they follow by weighing the alternative counsels that are offered them.

Now, fools and ignoramuses can make no such choice. It follows, therefore, that concurrent with selective higher education for some, there must (and, these days, more than ever) be further education for all.

Among the many agencies capable of contributing to this universal, further education, the colleges and universities are preeminent in the experience, the personnel and the resources at their disposal. While remaining refined and discriminating wine tasters, they must lend their taste for excellence to the bottling of a great variety of wines of palatable, if of lesser quality. In other words, without losing their touch for excellence, they must become more human in their understanding and concern with the approaches thereto. I devote the rest of this paper to suggesting ways and means in which this can be done. The ways proposed are, of course, illustrative only, not exhaustive. Local, regional and national initiative and imagination alone can spell out the whole equation. And, as with my suggestions for on-campus reforms, reject, of what follows, what you see fit — but substitute a better alternative. The means proposed may well be ill-conceived. The needs which they are intended to serve would seem to be beyond dispute.

1) The Colleges and The Mass Media

Higher education, because concerned always with a given, time-bound generation, must always mediate the "truth," as it knows and sees it, in the social context with which its wards have to cope. (To Aristotle's dictum that we must "think like a wise man, but communicate in the language of the people" we must add "and in the context of the times.") After long centuries, through which it shared with the churches a monopoly in the transmission of tradition (in the sense of customs and ideas that have survived the test of time) and of cultural values, it now faces stiff competition. There are now two voices in the land — the old voice of the educator and the preacher and the new voice of the mass communicator — and, let's face it, the two neither always speak, nor bespeak, the same values. Education has, for a half century, tragically failed to recognize, or at any rate to admit, this fact and consequently has neither harnessed to its own ends and purposes what is health giving in mass communication nor provided the antibodies for that which, to the cultural bloodstream, is poisonous or debilitating in what mass communication offers. Least of all has it recognized its role in using mass media constructively as a countervailing force to its abuse by those who exploit it for commercial purposes.

There are in existence some 300 'educational' radio stations. If those in higher education saw and seized their opportunity, there could be hundreds more, constituting, as needed, local outlets or regional or national hookups for the transmission of all that colleges and universities hold dear and have to offer. No institution, or combination of institutions, could contribute more to the disinterment and resuscitation of a unique and life giving medium. Of radio's on-campus use I have written earlier. What of its extramural use?

Consider what has gone by the board in radio's "rationalization" for purposes of commercial profit. There is the now all but dead art of radio drama. (Remember McLeish's "The Fall of the City," Corwin's work, the early experimental work of the Columbia Radio Workshop.) Universities owe duty to the encouragement of all forms of art, and above all the experimental and the contemporary. The renaissance of a new art is available to them — as part of the education of the young and of a living university's contribution to society at large. Radio as a vehicle for communicating, whether the eternal verities or our time-bound preoccupations and perplexities, has unique resources. The college and the university are its natural habitat, not only as the

nurseries of art but as institutions committed to enduring values and perceptions undistracted by temporary whims and predilections. A start could be made here, therefore, (I am not sanguine of any quick returns) to recover for radio modes of communication that are properly her own and merely usurped (see earlier) by television.

As countervailing force it is higher education that could restore, whether for local, regional or national consumption, the lost voice and influence of the commentator on events, ideas and issues — and, even more importantly, the free market place of thought, without which a democracy cannot long survive, through wide ranging discussion of controversial ideas. Nothing, perhaps, is culturally more frightening in the last decade than the narrowing range of "respectable" and therefore permissible expression of opinion. This is a cancer more death dealing, over the long haul, to academic freedom and, therefore, the survival of higher education than any current cultural phenomenon. Thus, self interest is joined with public interest in its arrest. I can think of nothing more calculated to add lustre to and win public confidence and gratitude to higher education than such use of radio. There is ample evidence that in this and like references (I've again only exemplified) the number of hungry sheep that look up and are not fed far exceeds what the commercial exploiters of radio — as of television — would have us believe.

2) Non-Credit Courses

The use of radio, as well as television, to economize and make more effective use of the depleted ranks of faculty, as also to extend service for formal credit to the home-bound has been earlier demonstrated. Broadcast on open circuit, it also brings within the influence of higher education those hungry for knowledge or self-improvement though unconcerned with formal, academic work and credit earning. Chicago's TV College has shown that for every "formal" student registered for credit there are anything from ten to a hundred "informal" eavesdroppers. Apply the true yardstick, suggested earlier, for differentiating the proper spheres of radio and television, and comparable services by radio to the public at large is feasible. Much, too, presently provided for formal credit (in Chicago and elsewhere) over television could, given application of the yardstick, be done as well by radio — at prodigious savings of expenditure. This holds particularly true for one pressing need resulting from the crisis in education, namely, teacher education. It applies also to University extension services, ensuring savings of time, travel, personnel, as well as the proliferation of such services — and all at higher levels of quality performance. Extension as well as on-campus service can, with the advent of broadcasting, be confined to the best instructors available. And because they can, they should be.

3) Professional "In Service" Training

Virtually unexplored — given the extent of need and of services potentially available — is provision by colleges and universities of further education beyond even graduate studies. In many professional walks of life, particularly those related to science, a man five years past graduation is already out of date and in desperate need of refurbishing his knowledge. The medical profession has for years attested to this fact. WNYC's "For Doctors Only" series on radio — and the response thereto — is but one example of the scope for service in a dozen related fields.

4) Education for Leisure

This warrants a position paper of its own. Informal, as well as formal, education is in dire need of retooling in light of the social-economic-cultural revolution that has

has already overtaken us. One expert claims that cybernetics is displacing labor at the rate, right now, of 40,000 men a week. Retraining and instruction in fruitful use of leisure, both, are desperate needs if we are to stem the tide of juvenile delinquency and social unrest that is mounting from day to day. New thinking and new services are needed and who better than those in higher education can do the thinking and what media better than radio and television can provide the service on the scale required by the mounting numbers of those in need of it?

5) Needed Education Overseas

More and more foreigners come to the United States for the professional and technical know-how that (particularly in underdeveloped countries) have become conditions of survival. Many need, in fact, never come at all. A nucleus of co-operating universities could provide instruction in a score of technical fields transmitted by short wave radio to countries all over the world. A global American University of the Air (and here, at least, television for the time being is no rival and for at least a half century will be prohibitively costly) is technically feasible and a pipe dream only for such as lack imagination and initiative. And for the foreign visiting fireman (as I know at first hand from conducting seminars with them) there is need, far beyond what we now provide, for opportunity to see and use equipment and to receive instruction in the use of radio as a tool for both formal and informal education. University Communication Centers are the obvious foci for such study and instruction.

6) Radio Conferences and Colloquia

Of perhaps minor but not negligible value are the possibilities of enriching conferences and colloquia by inclusion of men of distinction — the nation and the world over — unable to be present in the flesh, but whose voice can be brought by radio to contribute to deliberations. This is but a concluding example of the fact that we have failed to grasp — that with radio communication it is the student's prerogative to have access, and in his home, to the finest talent of every sort communicable by sound — his prerogative because it is physically possible and circumstantially required by the demanding cultural and educational claims upon us of a new and revolutionary age.

Conclusion

The above is far from an exhaustive list of the possibilities of radio's use in higher education, and deliberately so. It is suggestive of possibilities that no one man's imagination can encompass and that must be explored and exploited with a knowledge of local, regional or national need unknown to the theorist. There is thus no "conclusion to the whole matter," only openended and limitless possibilities. That any one of them will be realized is, frankly, doubtful, such is the obtuseness and inbred conservatism of the educational profession. The demonstration of radio's possibilities would seem to me to depend on the following considerations.

1) There must be clear recognition that the preoccupation with television creates a built-in resistance to the grasp of radio's true, distinctive role.

2) Consequently such demonstration of radio's potentialities as is attempted must be so striking and professionally competent as positively to arrest and startle people into interest. Careful pretests and trials are paramount.

3) The condition of attention to such demonstration is a carefully planned and well executed publicity campaign. Radio must be made "news" by all the timed, promotional devices known to modern advertising.

4) Consequently time is essential for conception of a well conceived strategy and detailed design of the tactics. And for strategy you need a fieldmarshal, as for tactics you need field officers of top flight capacity.

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MODERN TOWERS OF BABEL

Ronald L. Hunt

MODERN TOWERS OF BABEL

And the whole earth was of one language and of one speech. And it came to pass as they journeyed east, that they found a plain in the land of Shinar: and they dwelt there. And they said one to another, come let us make brick, and burn them thoroughly. And they had brick for stone, and slime had they for mortar. And they said, come let us build us a city, and a tower whose top may reach unto heaven, and let us make a name; lest we be scattered abroad upon the face of the whole earth. And Jehovah came down to see the city and the tower, which the children of men builded. And Jehovah said, behold, they are one people, and they have all one language; and now nothing will be withholden from them, which they purpose to do. Come, let us go down and there confound their language, that they may not understand one another's speech. So Jehovah scattered them abroad from thence upon the face of all the earth.

Genesis 11

After the deluge, the children of Israel devoted themselves to an effort of single purpose. They wished to build a tower to heaven and thereby to wisdom. Jehovah confounded their effort by confusing their tongues. The modern lesson learned from this ancient story is that man's achievement may be advanced by a united purpose and a language understood by all. To confuse either purpose or communication is to retard potential progress toward knowledge.

Today the National Association of Educational Broadcasters is reviewing the possible construction of new towers to interconnect the nation's pillars of learning. As surely as the children of Israel could make bricks and mortar, our modern technology can produce a communications system linking centers of learning from coast to coast, or even continent to continent. There is no question that, with proper financing and technical skill, such an interconnection could be accomplished. In fact, much of the machinery is already in existence.

There are several questions that may go beyond the immediate concerns for construction and may be eminently more important. The questions are akin to the problem of the Israelites after their language was confounded and they were scattered upon the face of the earth. First, just how effective is communication with the aid of electronic or audio-visual systems? Second, what, for example, does the University of Pennsylvania have to say to the University of Chicago? Third, how effective is communication within institutions of higher learning? Fourth, would an interinstitutional communications system actually aid in solving some of the problems faced by the nation in improving research and teaching? Can we afford to leave industrial and other private-research centers out of the picture?

In the simplest of terms, a communications system involves a sender, a message, a medium, and a receiver. Effective communication would presuppose a compatibility among all elements of the system. The keys to this compatibility are common purpose and language. Communications theory, literature, the dramatic and performing arts, science, engineering, and technology have produced much knowledge with respect to the sender, the message, and the various media. Little is known about the receiver. Without more extensive knowledge about the effects of communication on the ultimate consumer, the other three elements of the system must remain in the shadow of doubt. Just what is known about the effectiveness of communication?

In 1948, Berelson summarized his exhaustive review of communications research with the somewhat pessimistic conclusion that "some kinds of communication on some kinds of issues, brought to the attention of some kinds of people under some kinds of conditions, have some kinds of effects."¹ Thirteen years later Klapper set forth five generalizations from his review of research on the effects of mass communication with caution when he stated, "The author would like to make clear, however, that he is in no way committed to these particular generalizations, let alone to the exact form in which they appear."² He suggests that the time for generalizations is at hand.

In 1964, in another phase of communications research, Travers advanced three generalizations that were bound to cause some restless moments for producers. He states, "First, the evidence indicates that multiple sensory modality inputs are likely to be of value only when the rate of input of information is very slow. The common practice of filling both the audio and visual channels with a continuous flow of information would seem to have little support, except perhaps that it may satisfy some of the compulsions of film (and other) producers... Second, the quest for realism and the emphasis on realism which has characterized the audio-visual field emerges as a false god... Third, the perceptual model on which most audiovisual materials are based is already well recognized within the audio-visual area as being a thoroughly unsatisfactory one. Information is not satisfactorily stored when a passive learner is passively exposed to inputs though some learning may occur under such circumstances. While various attempts have been made to introduce activities as a part of the procedure involved in the use of audiovisual materials, the equipment involved does not appear to be particularly suited to the incorporation of learner activity. A part of the difficulty of incorporating such activity is that not much is known about the kinds of activity that results in effective retention and transfer."³

These doubts about the effectiveness of the various audio and visual communications media, including radio and television, are not new to broadcasters, producers, and teachers. Undaunted by the tentativeness of the research findings and the absence of verifiable perceptual models, they continue to broadcast, produce, and teach. They are somewhat akin to the bumble bee who flits from flower to flower while defying known principles of aerodynamics. The existence of an intercommunications network between institutions of higher learning may, in fact, influence future research within the fields of communication. First, the system may be used for the retrieval, synthesis, and dissemination of research questions and findings regarding communication. Second, such a network may play its greatest role as a tool of research for the application of theoretical perceptual models and the testing of hypotheses regarding the effects of communications on carefully selected populations in and out of the universities involved. If the pun may be permitted, the children of Israel felt that they had concrete evidence that their bricks and mortar would hold up. We cannot say the same about our modern communications media and systems.

The proposed interconnection of seats of learning would, presumably, be based on the assumption that there is something going on in each institution that would need to be communicated with others. A second assumption might contend that what would be communicated at one end would be of value and would be understood at the other. Recently, a superintendent of schools who participated in a meeting concerning innovations in education commented that if he could get the seventh grade teacher in room six to exchange ideas

¹Berelson, "Communications and Public Opinion," Communications in Modern Society, Schramm, Wilbur, University of Illinois Press, Urbana, Illinois.

²Klapper, Joseph T., The Effects of Mass Communication, The Free Press of Glencoe, Glencoe, Illinois, 1961.

³Travers, Robert M. W., Research and Theory Related to Audiovisual Information Transmission, University of Utah, Bureau of Educational Research, Salt Lake City, Utah, 1964.

with the seventh grade teacher in room seven he would be on the way to a major innovation in public education. Similarly, the communication between schools or departments within universities is often retarded by sometimes an unwillingness, more often an inability, to exchange information. First, the various disciplines found within a university are confounded by many languages. Those who have participated in interdisciplinary seminars involving scholars from the sciences and humanities have found such meetings fraught with semantic taffy pulling and a frustrating search for common definitions. Furthermore, the languages within the disciplines are changing. It has been contended that a biologist separated from his field for a period of eight years would find the language of his discipline difficult to understand. Industries claim that the half-life of an engineer is five years. Yet, these problems of interdisciplinary communication may suggest an intriguing challenge to the National Association of Educational Broadcasters. Could such a system as proposed in the ECS plan actually afford scholars within and between institutions of higher learning opportunities for more effective communication? What does the University of Pennsylvania have to say to the University of Chicago? Potentially, a great deal if what is said touches upon a key to common purpose for the sender and receiver and if the language is understood. Such an exchange would be dependent more on a dialogue than a discourse.

The children of Israel sought to build a tower that would take them to infinite wisdom and knowledge. Today, we are not only scattered abroad by language difficulties, but also by the volume of information. The magnitude of the problem of data retrieval, dissemination, and synthesis is apparent in our modern fields of technology. Thirty million books now on the shelves are being added to at the rate of 600 a day. More than 100,000 special journals are published each year dealing exclusively with science and technology. IBM predicts a national expenditure of one hundred million dollars for information retrieval in 1965, and a doubling of that figure each three years thereafter. The need for improved data retrieval and dissemination becomes apparent to the manager of research or a principal investigator who discovers, after exhaustive and costly research, that his findings were in the library all the time. Radio and telephone systems have already been used to connect researchers with computers many miles away. The interconnection of seats of learning, including universities, via a communications system equipped for data retrieval and dissemination capabilities may hold great promise for the future. With an estimated loss of seven and one-half billion dollars a year due to the unnecessary duplication of scientific research more effective systems would seem imperative.

The statement "including universities" was a deliberate aside. The university is not the only sea of learning in our modern society. At the present time this nation is attempting to hold its defense budget at or under fifty billion dollars. A sizable portion of this budget will go to businesses, industries, private research facilities, and universities for fundamental and applied research. With such encouragement General Electric or General Motors often employ more Ph.D.'s than universities in the communities in which they are located. American industry spends more for research (and more for training and education) than the total annual budget for all of public education in the United States. One of the serious problems facing the nation and its scholars today is the failure of knowledge-producing agencies to communicate with one another. Part of this failure is due to the data deluge. Another part must be laid at the doorstep of a protection of information for reasons of national security and proprietary rights. It is possible that as much, if not more, could be gained by interconnecting the University of Pennsylvania with General Electric than with the University of Chicago. One would hope that none would be excluded from a needs study of the ultimate plan.

Our modern Tower of Babel is being constructed of paper. It may fall of its own weight. The obvious next step in the retrieval, synthesis, and dissemination of information relevant to the advancement of human knowledge will be via electronic systems of communication. Could we hope that even the smallest college would have direct electronic access to the

library of the largest university; and that the university might be electronically connected to major industrial computer systems and libraries? The technology is within our grasp. There is no reason to believe that radio could not make a significant contribution toward these ends if it were the will of industrial and university centers to do so. NAEB may have the potentiality to provide both the bill and the way.

Would it be possible to interconnect those knowledge-producing agencies which are concerned with the effects of electronic communication and to use the system as a tool of research? The technology is within our grasp. But would the protection of proprietary rights and the national security impede our progress toward greater knowledge in the field? NAEB might well be the organization to find out.

Could it be within the realm of electronic communication to provide a unifying element that may aid the growth of an interdisciplinary dialogue within and among our nation's seats of learning? For the sake of the advancement of human knowledge such an endeavor would be worth a try.

Our modern Tower of Babel may have as a modern objective the dream that "they have all one language; and now nothing will be withheld from them which they purpose to do."

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BARRIERS TO THE USE OF
EDUCATIONAL AND INSTRUCTIONAL
TELEVISION

C. R. Carpenter

R. N. Willis

BARRIERS TO THE USE OF EDUCATIONAL AND INSTRUCTIONAL TELEVISION

The status of educational and instructional television is similar in most respects throughout the nation. The country is moving toward the completion of the first of three major phases of a progression of developments. The three phases which can be delineated are the following:

Phase I of this development has involved the general determination to use television for educational purposes, to secure and provide authorized channels, to secure and establish facilities, to explore and test by exploratory research some of the possible applications, and to introduce the medium in preliminary ways into the educational institutions and enterprises. The completion of Phase I is being advanced by a program of Federal grants which will probably add about one hundred million dollars worth of equipment to the nation's educational and instructional broadcast facilities. However, the completion of this founding phase of the whole educational television development is a great and necessary but not a completely adequate achievement. A crucial next step is to realize and define the requirements and problems for undertaking and accomplishing Phase II of the total development.

Phase II will accept the availability of channels, facilities, the results of exploratory research and tentative provisional innovations, and then move into a strong effort to bring to bear the necessary resources for designing, producing, field testing and using instructional materials of the highest possible quality. First, determinations must be made systematically and objectively of the crucial educational needs of the people to whom institutions of higher education are responsible. Second, means must be provided for selecting or preparing and producing instructional materials of the highest possible quality which are congruent with modern educational needs. Third, educational television must be moved from the status of a timid, provisional improvisation and into the main streams of educational effort. Fourth, extensive efforts of many kinds need to be made to insure that available facilities and appropriate instructional materials of the highest quality are used extensively enough to meet educational needs and be consistent with sound and defensible educational and economic principles.

In brief, Phase II involves the selection, organization, preparation, production and use of instructional materials of superior quality that can be unquestionably accepted by junior colleges, universities, and continuing education — and made effectively available to all those who need to learn and need to be trained.

A related major and continuing effort must be made in developing varied and new patterns of both productions and uses to meet definable educational standards and requirements. It will be in this connection that support and continuing research and development work will need to be done, not as separate isolated projects, but as an integral part of the selection, preparation, production and distribution of instructional materials.

Phase III, which lies in the future, will consist of the mature and extended uses of educational television and related instructional media. Having mastered the skills needed to use one thin layer of instruction, many channels on both closed and open circuits will be required. Sufficient instructional programs will be available and used to make a significant difference in the economics and all other practical operations of colleges and universities. At that time the total configurations of educational institutions will be changed importantly. The roles of both faculty members and of students will be changed, and will continue to change, as new technological developments antique the equipment, operations and procedures which have characterized Phases I and II of the life of educational and instructional television.

A prominent characteristic of technology which should be recognized is rapid change and antiquation of facilities and the methods of using them, and the imperative development and uses of new facilities. In these respects educational technologies are similar to other technologies of industry, business, transportation and communication. However, due to our extended commitments relative to limited resources, and to the traditional long-term use of buildings and facilities (often beyond periods of best usefulness), the management of educational enterprises has failed to estimate accurately and provide for rapid developments and changes in educational facilities, equipment, and rates of antiquation.

Television and other instructional media are good examples: the relatively large investments required to establish educational television facilities and promotional efforts needed to secure the resources have led to acceptance by legislatures and administrators of several unsound conditions and expectations. There are unsound or incomplete economic analyses of costs and educational returns on investments. The cost of equipment has seemed high as a new budget item and generally operating costs have been underestimated; therefore, a false expectancy has been built up that the availability of facilities will insure desired results, when, in fact, the first capital investment is only the first and smallest part of the total needed investment. A belief has been fostered that great economic savings can be made by using broadcast television. This result has been anticipated without carefully calculating the amounts and rates of utility and changes in regular procedures and method which would make financial savings possible. Furthermore, the assumption is widespread, as shown by actual operations, that television can be added to institutions and educational systems without markedly changing standard traditional requirements for funds, building, facilities, and personnel. And finally, it seems to have been expected that entire courses and programs of instruction could be successfully provided by television alone.

In this connection a principle can be stated: When a new development of significant dimensions is properly introduced into an institution or educational system, then its introduction significantly changes many or most of the other parts of the institutional system. The new component is not simply added. Budgets are changed, building and facilities plans are modified, personnel requirements are changed, methods of work are modified, and the results or effects on learning and training are different from what they were before the innovation was introduced.

The recognition and application of this principle would lead to important reformations in the budgets, operations and results of the work of colleges and universities under the condition where educational and instructional television (and related media) are introduced appropriately, for the right purposes and the right amounts.

This line of reasoning leads to another useful principle, the principle of growth and expansion. The size of the educational job, in all of its dimensions and at all levels of higher education, is overwhelming; and additionally there are present and near-future increases in demands that can be predicted. These increases are well known by the government and educational administrators. Great efforts and expenditures have been and are being made to provide the funds, buildings, facilities, and personnel to accomplish, if possible, what needs to be done. All types of facilities are being expanded, increased and duplicated. Dramatically, entire colleges and universities continue to be planned and build as a single project.

However, the principle of growth and expansion that urgently needs to be considered, studied, and applied is the following: Along the line of growth and expansion there is a conversion point where the quantities involved become so large that they actually change the qualities of the requirements, adjustments, and adaptations. For example, educating 300,000 college and university students at the different levels and in ways in which they need to be educated is so different in magnitude as to become different qualitatively compared

with educating 30,000 students. Old procedures and means become inadequate and new approaches and methods must be found. The nation has not solved today's transportation problems by extending the wagon-and-mule teams of the 1800's . . . In other words, there is not only more of the "problem" but the problem becomes different in kind. Therefore, the same solutions that have been used and have "worked" for the smaller problem will not be appropriate and adequate for the expanded and growing problem. Hence, as the nature of the problem changes, new and different solutions must be discovered and applied — not merely extensions of old solutions.

Generally, solutions to the increasing dimensions of problems have been provided by expanding and duplicating the existing means. The growth of educational facilities has tended to follow this course. Facilities and organizations have been increased and added, and this is continuing. However, what has not been done sufficiently is to analyze the requirements at the conversion or transformation points on the growth curve and to answer the questions of what must be done that is new and very different in order to solve the whole new problem.

Many new things have been done in the field of education to meet the challenge of numbers and to improve learning outcomes, but there is at least one development which is in line with attempts to find really new solutions. It signals recognition of the principle stated above that as the dimensions of the problems increase they cannot be solved merely by adding more and more of the same solutions, i.e., more funds, more of the same kinds of buildings and facilities, more personnel doing the same kinds of jobs as in the past. This notable example is the introduction of educational broadcast television and the development of state-wide networks of facilities around the nation. It is this innovation and its appropriate and justifiable uses which is of concern here.

The Central Problem

The question being asked widely is the following: In view of the investments which have been made by state governments in educational broadcast facilities, why are the facilities not being used more extensively and effectively for providing formal instruction? Imbedded in this question is the assumption that television broadcast facilities are, indeed, not being used for formal credit instruction both for students registered with the universities and for continuing education.

The above question leads to several other questions. First, are the facilities already provided really adequate for meeting the needs of formal instruction beyond high school? If they are not, this condition may be a major block, among others, to effective, efficient, and extensive utilization of television. The answer, however, would appear to be negative; entirely adequate facilities are not yet available. For example, many stations have only one studio, whereas at least three studios are needed (unless methods of operations are drastically changed) if these stations are to produce, originate, and distribute instructional materials to a reasonable and extensive level.

Further, many universities and colleges do not have closed-circuit facilities for numerous potential uses on campus; e.g., familiarizing and training faculty members, serving large groups of students in basic courses, aiding in the early development and pretesting of instructional materials and for many kinds of basic and applied research on teaching and learning by television. Such stations are mainly facilities for reproducing and distributing video tapes, for the limited origination of "live" programs, and for a still more limited use of recording some program materials on video tape. Even where closed-circuit facilities have been installed the facilities often are marked by serious inadequacies and limitations. Poorly designed or adapted classrooms frequently are assigned for use by closed-circuit, and non-televised components of courses are not always well-managed.

Much new and modernized equipment is rapidly becoming needed by the older stations. The principal handicap, however, is the too frequently improvised and inadequate space for the kind of production work now so urgently needed. Needless to say, many stations have not had, nor do they now have, adequate financial support. Many older stations, having made television history, suffer by comparison with the new stations — even within the same educational system! These newer stations generally receive more support and are better equipped.

Another set of developments, or set of conditions, bordering on an educational tragedy reflects in miniature the birth pains which may signal the life or death of instructional or educative television. The tragedy is simply that distinguished teachers, with all of their preparation for the job and with the technical help which they are given plus financial support, can produce courses on video tape only to have these materials so frequently "put in cans" and not used. These recorded courses are often not even used in the university where they were produced. They may not even be used by the department which permitted, even if it did not approve, their production. The courses may not even be used in any other institutions of the educational system. It is especially unfortunate when they are not used in junior colleges.

Such a problem deserves intensive analysis because it probably reflects most of the elements of the heart of the larger problem of why instructional television is not adequately used. Until several case studies of specific course tragedies are made and the real causes for their "canning" are determined, the following hypotheses are proposed for study:

1. Members of a department who influence or decide in the negative about using a course are not adequately involved in deciding to produce the course on tape, nor are they involved in the many complex judgments about course content, themes, emphases, order, and in the preparation of the course.
2. The course is not used because it was produced under the "star system," i.e., "get the most distinguished teacher available, give him television production help and full time for work and let him teach the course."
3. The inhibitory effects of envy, professional and personal jealousy of members of the department exist because of the selection, special considerations, and public and professional visibility which accrue to the television professor.
4. Differences exist in objective and professional judgments about what content the course should have and about approaches to its development and organization.
5. A belief exists that if a course of lecture demonstrations is recorded and presented to students over television, it cannot be good enough to be acceptable in a "first class" university.
6. The classroom conditions for presenting the course to students are poor and the supplementary methods to be used, e.g., having regular faculty members monitor studios in classrooms, are inappropriate, uneconomical, and will produce adverse reactions.
7. Members of the faculty want to teach the televised course in the normal way in order to have a balanced or varied teaching load.
8. Student acceptances and responses to the televised course are poor and threaten to reduce course enrollments.

9. The televised course is actually less effective as determined by good measurements and objective judgments to comparable results achieved by large-class lecture demonstrations.
10. The recorded course actually does, or seems to, threaten displacement of faculty members from their habituated roles as teachers, showing that their teaching role will have to change from what it has been traditionally.
11. The recorded course is introduced too quickly, over a too short period of time, thus producing "academic shock," and does not provide for the gradual and perhaps necessary accommodation of faculty members to the innovation.
12. Levels of administration above the department level take no positions or postures, if indeed they are involved in the issue, which are favorable for having the recorded course used regularly as an alternative to large-class and lecture demonstrations.
13. Lack of conviction prevails among faculty members concerning the magnitude of the educational problem and uncertainty is present with regard to who is responsible for taking appropriate action on this problem.
14. The complexity and massiveness of education relative to innovations and correlated trends to preserve existing balances of power in the structure tend to thwart effective use of television for instruction.
15. Fear of dehumanization of education by educational technology acts to block the effective use of television for instruction.

The factors indicated or suggested by the fifteen hypotheses stated above may point to the principal blocks or barriers which act to prevent the adequate utilization of educative television. It should be noted, however, that courses produced by college and university faculty for elementary and secondary school use tend to be widely accepted, illustrating the principle that the greater need existing in grade schools for shared instruction creates a greater readiness to accept recorded courses. Also, it might be observed that basic courses produced by colleges and universities are more likely to be accepted on the secondary levels than by other colleges and universities.

With enrollments mounting, there appears to be no reasonable alternative to the effective and efficient employment of television and related media in the main lines of instruction. There is an urgent and crucial need for the production and recording on video tapes of instructional materials of the highest possible quality. There is the requirement, also, that such materials when produced will be accepted and used — not only in the university producing them but in many universities.

Herein lies another fundamental principle: The kinds and amounts of investments which must be made to prepare and produce courses of instruction of high quality are so great that such courses cannot be developed and justified economically and educationally by and for use in only one university. The costs require much greater utility than can be had in one university. A model which permits the kinds and amounts of interinstitutional cooperation required to accomplish what is suggested in the above principle will perhaps provide a desirable basis for reducing the exclusiveness, duplication, and false autonomy which characterize many institutions of higher education in America.

Research and Development and Production

Phase I of the development of educational and instructional television, which consists of securing channels and facilities, is being accomplished in the United States on a scale

and even at a rate that is unparalleled by other nations. While this phase of the development is taking place, there are growing realizations that Phase II, which involves the central problem of learning how to manage effectively the growing networks of facilities and communication powers for attaining the most deserving purposes of education, instruction, and training, is becoming the next great challenge.

The great and necessary efforts involved in Phase I of solving legal, public relations, engineering, and financial problems now, in some respects, become reduced and changed although not completed. At this time the focus of effort needs to be on how to adapt, develop, and use the communication facilities which are available, or "within our reach," for accomplishing the main tasks of education, instruction, and training. Stated differently, the problem is to align and integrate the facilities and potentialities of television and related media with the main efforts and purposes of universities and colleges.

There are requirements which can be outlined if this challenge and these opportunities are to be met satisfactorily. Some of the requirements are:

1. To recognize that conditions must be provided or arranged which are favorable for accomplishing the objectives of Phase II. Among these conditions are (a) new conceptualizations of the whole task, (b) availability of very competent personnel who are primarily educators and content authorities but who also know television and how best it can be used to instigate learning, (c) adequate funds for the production of instructional materials of the highest quality and effectiveness for learning, (d) new and specialized research-and-development and production buildings and facilities, and (e) the full and unreserved commitment of the universities and colleges to the efforts and objectives of Phase II.
2. To reorganize the responsible organizations and institutions in order to provide the requirements necessary for successfully accomplishing Phase II. The reorganization needs to be done first to remove the principal barriers and blocks to the development of television as an instrumentality of the educational system, and secondly, to make educational television an integral sub-system of functions within the institution. Television needs to be moved from the status of a side show, which is incidental and peripheral to the principal activities of the institutions, and made a central part of the ways that are being used to do the work of the institution. This development will have important effects on budgets, staffing, buildings, facilities, methods of instruction and learning, and therefore on the educational effects, standards, and productivity.
3. To define or redefine the responsibilities of all agencies relative to the accomplishment of a wide range of educational tasks by television. Especially involved with the redefinition of the responsibilities of boards of higher education, state educational television agencies, and the interlocking responsibilities of universities, colleges, and junior colleges, both in the public and private support patterns.
4. To recognize that television is primarily a mechanism of distribution and dissemination and therefore has very great potentialities for reaching large numbers of those who would learn and for moving information in many modes to dispersed populations of learners or students. However, there is also the requirement to recognize that the educational effects depend primarily on the kinds and quality of instructional materials channelled through television to those who would learn by interacting with them. Furthermore, the conditions of reception are important.
5. Finally, it must be recognized that merely distributing instruction by television is only a part of the whole job of effective instruction and learning. Many other kinds

of reinforcing and complementary materials are needed. In short, and once again, the great challenge of Phase II is to learn through research and development approaches how best to use the complicated educational technologies that are within our reach and that consist of new media systems.

Conclusions

This section of this article can be concluded by the following statement of the problem: The removal of the barriers to the effective, justified and adequate use of television in educational systems cannot be done by a "patch and splice" approach. The problem cannot be solved by creating more new specialized organizations to deal with the problems of television. The problem can be solved only when the complex of television is moved into the very hearts of educational institutions, and supported, administered, developed and used to accomplish their main purposes. The model of libraries is close and applicable. Television facilities and potentialities, like libraries and their services, need to be accepted and used when and where appropriate to support faculties in meeting the overwhelming and increasing educational demands that are being made on them. The task is large. It is broad and pervasive. It can be done and the possible results will justify the necessary funds and efforts. In fact, the correct use of television offers one of only four alternative ways of accomplishing the massive educational jobs which need to be done: (1) Avoid the problem, (2) Continue present operations, (3) Expand them in kind, (4) Use the mass media appropriately.

Summary Statements

Three interlocking phases of development of educational television in the nation were defined as an approach to providing a perspective or frame of reference for conceptualizing the complex of problems and for suggesting action:

Phase I. The acquisition of channels and basic facilities and their preliminary introduction and use.

Phase II. Research and development on the selection, organization, production and testing of instructional-learning materials of the highest possible quality and of the greatest appropriateness for accomplishing deserving educational objectives.

Phase III. Extension of the scope and uses of instructional television materials and facilities for doing a balanced proportion of the total educational job.

Educational television in higher education is in Phase I; however, awareness of the need to move to Phases II and III is beginning to develop. A major next step is to define the requirements for completing Phase I and moving expeditiously into Phases II and III.

Fifteen hypotheses were stated for study relative to the processes of introducing an innovation like instructional television into an educational institution, and these hypotheses point to possible barriers to the successful introduction of television into a university and hence into a state educational system.

The costs in efforts and funds needed to produce instructional materials of the highest quality and appropriateness are so great that Phase II can only reasonably be accomplished by concerted co-operative efforts on the part of all responsible organizations and institutions.

Both favorable and adverse conditions exist for moving successfully into Phases II and III of the full development and application of instructional television technology. All of these conditions need to be studied, corrected, and brought into alignment. The conditions, both favorable and unfavorable, vary greatly from one university to another, and there are great possible gains to be had from exchanges of information, concerted study of common problems and sharing of facilities and services. It is especially urgent and appropriate that the universities and colleges, including the junior colleges, combine their resources and involve their most competent people in the definition of common-denominator-instructional-needs which can be appropriately, although only partially, met by the various uses of television. Their task will be to select, organize, produce, field test, and distribute superior instructional materials and resources for broad and justified uses.

There are no organizational substitutes, although there may be organizational assistance, for the institutions of higher education taking directly the responsibility and initiative in completing Phase I and entering Phases II and III of the development of instructional television. The crucial issue is either to move educational and instructional television into the main life stream of the institutions of higher education or to determine that it shall continue to be an eddy of little consequence and then support it accordingly.

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VI Conclusions

The investigators, generally conversant with major recent developments in educational media and hopefully aware of some educational implications in modern industrial technology, anticipated a generally positive response to the Phase II Survey. Nevertheless, the response actually encountered was, literally, surprising. The level of interest is such that many universities, state systems, and professional groups are already engaged in cooperative activities that could be facilitated greatly by electronic interconnection. The element missing in these projects—and welcomed enthusiastically almost everywhere—is the "system" approach to interconnection problems.

This high level of acceptance was found equally in senior academic officers (presidents, provosts, academic vice-presidents) and members of teaching or operating staffs (teaching faculty, librarians, broadcasters, computer specialists, directors of continuing education, admissions officers, etc.).

It is the conclusion of the project staff, based on the extensive Phase II interview schedule, that the concept of an educational communications system represents a development of fundamental importance to American education, and that a great many academic and administrative areas eventually will be affected.

In order to test a concept that could have such a pervasive effect, it will be necessary to assure involvement of professional groups, representative institutions, and academic leadership. We therefore, conclude:

1. that we should proceed as planned with Phase III of the study;
2. that the advisory committee should be expanded to a minimum of ten members, in order to improve professional, institutional, and geographic representation;
3. that Phase III should be conducted over a period of at least eighteen months, with a careful program of involvement by many affected professional groups and institutional representatives;
4. that Phase III should result in a plan for a model or models appropriate for experimental implementation of the ECS concept in Phase IV;
5. that all procedures beginning with Phase III be designed to facilitate eventual use of the findings in a full-scale plan for the use of system-centered electronic interconnection by and for American education.

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VII

Plan of Operation for Phase III

BACKGROUND

Ten months ago there was little organized documentation to support the thesis that colleges and universities were interested in facilitating institutional cooperation. As a result of the study conducted by the National Association of Educational Broadcasters, it is now possible to report that there is not only considerable interest, but there are active cooperative programs underway. Furthermore, representatives of nearly 50 major institutions of higher learning have made clear that electronic interconnection of some description is felt to be academically and administratively valuable. Projected uses range from facilitating student record transfers to the development of cooperative research techniques, to the improvement of instruction through cooperative teaching.

OBJECTIVES

The purpose of Phase III of the study is to provide information about educational objectives, technical requirements, administrative organization, and costs involved in the development and operation of an Educational Communications System.

To do this a framework must be provided within which these factors can be given proper consideration. Therefore, it will be necessary to establish experimental models that will serve as potential systems. Within each situation it will then be possible to consider the various instructional purposes which the system can be designed to satisfy and the resulting legal, technical, financial, and administrative considerations.

In order that each of the models represent a different kind of problem, the investigators will establish one model to consider an intra-state communications system, another to establish an inter-state communications system, and a third which will be regional in nature and will consider interconnection with non-university resources such as the Library of Congress, computation centers, and other specialized research facilities.

PROCEDURES FOR CONDUCTING THE INVESTIGATION

The following steps will be followed in conducting Phase III:

- A. First, the locations of the model systems will be decided. This will be based on a study of institutional characteristics that are appropriate to the respective model systems, the communications likely to be involved, and the appropriateness of the model to other areas.
- B. Selection of field personnel will be made after the model systems have been located.

C. Educational specifications of the model systems will be determined. This decision will follow consultation with faculty groups, administrative personnel, professional consultants, and the Advisory Committee. During this period, local committees will be developed to work with field personnel to delineate instructional and administrative goals and to develop broadly based institutional support for the system.

D. On the basis of educational specifications, technical designs and requirements will be prepared by the staff and by the engineering consultants. Further study will be given to technical designs now available for multi-purpose communication systems through consultation with engineers and common carrier groups.

This aspect of the study will indicate the relative costs of various aspects of the system. Using various combinations of systems design, what costs are involved? Where are cut-off points? What technical limitations exist? Where is flexibility limited by technical factors?

The relationship of technical requirements to tariff regulations that affect multi-purpose communications transmission will be studied with FCC personnel and engineering consultants.

Finally, a decision will be made on specifications and requirements for the model systems.

E. In consultation with faculty committees, university administrators, and consultants, administrative structures will be developed to operate the various model systems. Operational economies that are developed in consultation with project engineers will be considered in establishing a satisfactory administrative plan.

When such administrative patterns have been formulated for model systems, they will be analyzed to determine what the structures have in common, in what way they are different and why, and to what extent they are applicable to other potential users.

F. Based on the study, investigation, and planning in the foregoing steps, three separate model educational communications systems will be specified including educational objectives, technical requirements, costs, and administrative structures.

G. The Advisory Committee will evaluate the model systems with respect to their ability to accomplish the purposes for which they have been established and the likelihood of success when they are implemented. Naturally any definitive evaluation must come with the operation of the experimental models.

H. Finally, a report of the study will be prepared, including a proposal for Phase IV, experimental operation.

Appendix

LIST OF INSTITUTIONS VISITED AND PRINCIPAL INTERVIEWEES, PHASE II SURVEY

SELECTED REFERENCES

EDUCATIONAL COMMUNICATIONS SYSTEM STUDY

PRINCIPAL INTERVIEWS DURING PHASE II

ALABAMA

University of Alabama
Tuscaloosa, Alabama

J. Jefferson Bennett, Administrative Vice President

CALIFORNIA

California State College System
Inglewood, California

Arthur Hall, Dean of Research

Foothill College
Los Altos Hills, California

Hubert Semans, Dean of Instruction

San Diego State College
San Diego, California

Donald Watson, Vice President for Academic Affairs

San Francisco Theological Seminary
San Francisco, California

Emory Johnson, Manager, KKKX

University of California
Berkeley, California

Clifford Dochterman, Assistant to the President

University of California
Berkeley, California

Robert Tachirgi, University Dean of Academic Planning

COLORADO

University of Colorado
Boulder, Colorado

Eugene Wilson, Vice President for Business Affairs

University of Denver
Denver, Colorado

Chester M. Alter, Chancellor

Western Interstate Commission on
Higher Education
Boulder, Colorado

Robert Kroepsch, Executive Director

CONNECTICUT

Trinity College
Hartford, Connecticut

Robert Vogel, Dean, Graduate Studies and Summer Session

University of Connecticut
Hartford, Connecticut

Albert Waugh, Provost

FLORIDA

Florida State University
Tallahassee, Florida

University of Florida
Gainesville, Florida

John E. Champion, Administrative Vice President

A. J. Robertson, Dean of University Relations

GEORGIA

University of Georgia
Athens, Georgia

A. B. Biscoe, Dean of Facilities

ILLINOIS

University of Illinois
Urbana, Illinois

Lyle H. Lanier, Provost

INDIANA

Indiana University
Bloomington, Indiana

George Johnson, Director of Broadcasting

Committee on Institutional
Cooperation
Lafayette, Indiana

Stanley Salwak, Director

IOWA

State University of Iowa
Iowa City, Iowa

Robert F. Ray, Dean of Extension and Special Services

KANSAS

Kansas State University
Manhattan, Kansas

Max Milbourn, Assistant to the President

KENTUCKY

University of Kentucky
Lexington, Kentucky

A. D. Albright, Vice President

LOUISIANA

Louisiana State University
Baton Rouge, Louisiana

Bertram Berenson, Research Professor of Architecture

Louisiana State University
Baton Rouge, Louisiana

Otis Wheeler, Assistant Dean of the Graduate School

MAINE

University of Maine
Orono, Maine

Lloyd Elliott, President

MASSACHUSETTS

Boston University
Boston, Massachusetts

Stewart Grout, Assistant to the Vice President
for Academic Affairs

Lowell Institute Cooperative
Broadcasting Council
Boston, Massachusetts

Hartford Gunn, General Manager

MICHIGAN

Michigan State University
East Lansing, Michigan

James Denison, Assistant to the President

MINNESOTA

University of Minnesota
Minneapolis, Minnesota

Burton Paulu, Director of Broadcasting

MISSOURI

Stephens College
Columbia, Missouri

James Rice, Academic Vice President

NEW HAMPSHIRE

University of New Hampshire
Durham, New Hampshire

J. A. Chase, Executive Vice President

NEW JERSEY

Rutgers, the State University
New Brunswick, New Jersey

Maurice T. Ayers, Assistant to the President

NORTH CAROLINA

University of North Carolina
Chapel Hill, North Carolina

J. Carlyle Sitterson, Dean of Facilities

University of North Carolina
Chapel Hill, North Carolina

C. R. Carpenter, Consultant

NORTH DAKOTA

University of North Dakota
Grand Forks, North Dakota

George W. Starcher, President

OKLAHOMA

University of Tulsa
Tulsa, Oklahoma

W. V. Holloway, Vice President and Dean of the
Graduate School

OHIO

Ohio University
Athens, Ohio

Thomas Smith, Vice President

Center for Continuing Medical
Education
Columbus, Ohio

Robert Schweikart, Director of Communications

Ohio State University
Columbus, Ohio

Dr. John Weaver, Vice President

OREGON

Oregon State System of Higher
Education
Eugene, Oregon

Roy Lieuallen, Chancellor

PENNSYLVANIA

Carnegie Institute of Technology
Pittsburgh, Pennsylvania

Alan Perlis, Director, Computations Center

Duquesne University
Pittsburgh, Pennsylvania

Father Edmund Supple, Academic Vice President

Pennsylvania State University
University Park, Pennsylvania

J. R. Rackley, Vice President

Pennsylvania State University
University Park, Pennsylvania

Leslie Greenhill, Director, Division of Instruc-
tional Services

SOUTH CAROLINA

University of South Carolina
Columbia, South Carolina

W. H. Paterson, Dean of the University

SOUTH DAKOTA

University of South Dakota
Vermillion, South Dakota

I. D. Weeks, President /

TENNESSEE

University of Tennessee
Knoxville, Tennessee

H. E. Spivey, Academic Vice President

TEXAS

University of Texas
Austin, Texas

Norman Ackerman, Vice President for Academic
Affairs

UTAH

University of Utah
Salt Lake City, Utah

Jack Adamson, Vice President for Academic
Affairs

VIRGINIA

University of Virginia
Charlottesville, Virginia

B. F. D. Runk, Dean of the University

Old Dominion College
Norfolk, Virginia

John Johnson, Provost

WASHINGTON

University of Washington
Seattle, Washington

Glenn Leggett, Provost

WISCONSIN

University of Wisconsin
Madison, Wisconsin

H. B. McCarty, Director of Broadcasting

SELECTED REFERENCES ON INSTITUTIONAL CO-OPERATION
THAT HAVE SPECIAL RELEVANCE TO DEVELOPING
AN EDUCATIONAL COMMUNICATIONS SYSTEM

REPORTER, A Clearing house of Studies on Higher Education, U. S. Government Printing Office, Washington, D. C.

This report, issued occasionally, contains a section devoted to studies on International Co-operation.

FEASIBILITY AND ROLE OF STATE AND REGIONAL NETWORKS IN EDUCATIONAL BROADCASTING, National Association of Educational Broadcasters, 1959.

Proceedings of a conference about the operation, planning and feasibility of live, interconnected state and regional networks for both educational television and educational radio.

M.I.T. COMPUTATION CENTER: RESEARCH AND EDUCATIONAL ACTIVITIES, Massachusetts Institute of Technology, Cambridge, Massachusetts.

This volume is issued semi-annually and reports on the uses made of the M.I.T. Computation Center by the Co-operating Colleges of New England.

REGIONAL ACTION, Southern Regional Education Board, Atlanta, Georgia.

This quarterly report provides information about current institutional co-operation in the area of the Southern Regional Education Board.